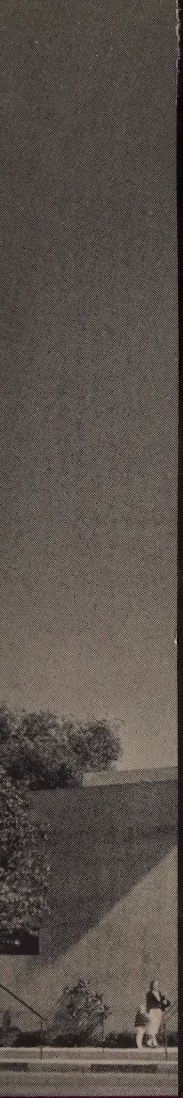


AR

VOLUME FOUR

NUMBER THREE

CBS STUDIO
Hollywood, Calif.
William Lescaze, Architect
Earl Heitschmidt, Associate Architect
Wm. Simpson Construction Co., Contractor

"A workshop for radio" is what Columbia Broadcasting System officials call their new building (also see cover) at Hollywood. Its concrete walls enclose functional spaces with forceful simplicity.

Architectural
CONCRETE

Plant for CBS—Hollywood

By William Lescaze, A.I.A.

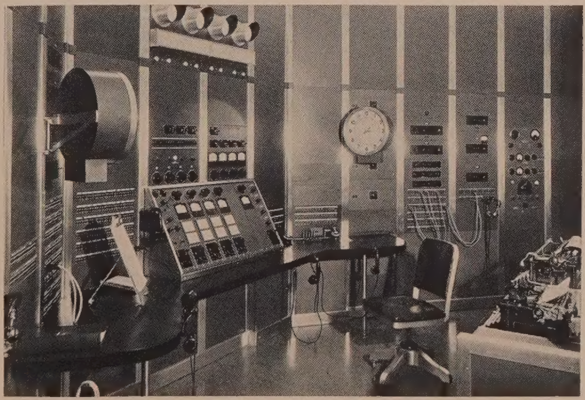
UNTIL quite recently the great majority of radio broadcasting studios have been built inside structures already erected. This has been more expedient than desirable, for while radio has been finding out what is best for it, it has had to adapt itself to growth and change in the most economical fashion. In the beginning none knew whether the future of radio would be the novelty of a rapid and rather mysterious form of communication, or—as it has turned out to be—an educational and entertainment institution, developed on highly commercial lines. It is doubtful whether anyone imagined that the room from which radio programs would originate in the future would resemble a theater in function and appearance, more than anything else, but such is the case.

As radio became the "theater of the air" it was increasingly apparent that existing theaters were inadequate for ideal broadcasting conditions. It was also evident that there had been stupid neglect of the simple ABC's of good theater construction—acoustics, sound isolation, pleasant lighting without glare, proper ventilation, efficient circulation and comfortable seats. Furthermore, when Columbia Broadcasting System decided to lease several old-fashioned theaters in various parts of the country and to broadcast from them, they tested the theaters first and found that ideal sound location was impossible to achieve even by extensive remodeling.

In early 1936, shortly after the Columbia System acquired the facilities of Station KNX with a view to expanding it into a key station for the origination of chain programs on the West Coast, the architect was called in to discuss the possibilities of incorporating the old property into a new and larger studio, or to do whatever else was necessary to achieve the ideal conditions desired. A few months of study revealed that there was but one thing to do—and that was to develop the CBS Pacific Coast center in the form of a new building instead of an adaptation of existing premises, and to create as acoustically perfect physical premises as was technically possible.

Before any drawings were made, the architect was authorized to consult with an acoustical expert, Dr. Vern O. Knudsen, consultant on acoustics at the University of Southern California. After the architect had convinced Dr. Knudsen of his desire to create architectural shapes to function in accordance with acoustical requirements, work was started in earnest to lay out a broadcasting plant in the new location on Sunset Boulevard in Los Angeles' Hollywood district.

Because the architectural forms of the structure were indicated by the requirements of the various theaters and studios within, and because the studios were not built into the structure, but the concrete structure was erected about the studios, it is logical to discuss first how sound control influenced the design.



Main control room for CBS and Station KNX

In the new studios, sound insulation and isolation were attained by: (1) design of essentially separate studios within the outer concrete shell of the building—equivalent to the "room within a room" principle; (2) separation of the floors, walls and ceilings of each studio from the main structure of the building by means of flexible supports, clips and hangers; (3) use of double doors to all studios; (4) isolation of all rotating or vibrating machinery by means of flexible supports; (5) use of a honeycomb of absorptive cells in all ventilating ducts; and (6) use of acoustical plaster in all corridors, lobbies, and public spaces in the vicinity of the studios.

The feature of greatest novelty in the design of the CBS studios is the use of inclined walls to minimize the effect of "room flutter," that is, the repeated reflections of sound between parallel walls. By inclining the walls 1 ft. in 10, flutter is not only suppressed but it is done without introducing diffraction irregularities. Inclined walls also provide more uniform distribution of intensity in the microphone end of the room. Absorptive material in the studios was distributed on three walls and the ceiling in such manner as to prevent sustained reflections between surfaces which are nearly parallel.

Thus it is apparent that the inclined walls, instead of being designed for the sake of appearance, are consistently functional elements and achieve esthetic qualities because they are proper and necessary—which is as it should be in every case of careful, purposeful design.

Although each studio is designed to have a "live" and a "dead" end, this principle was not carried to extreme. The wall of the live end is finished with hard plaster, as is the ceiling above this end. Otherwise, absorptive material is distributed over the remainder of the ceiling and other walls, staggered in checkerboard fashion to facilitate distribution and diffusion of sound through the studio, and to increase effective absorption at low frequencies.

The largest studio is a theater with a seating capacity of 1,050. A semi-portable orchestra shell provides a stage which can be used for symphony or concert programs. Other stage settings provide ideal conditions for musical comedies and the variety type of program so popular in recent years. Control of reverberation in the large theater is accomplished by use of acoustical plaster applied to rough and scratch coats of hard plaster on metal lath and by heavily upholstered chairs. The chairs, with both seats and backs upholstered, are so absorptive that reverberation is almost independent of the size of audience.

All offices and work rooms are treated with acoustical plaster.

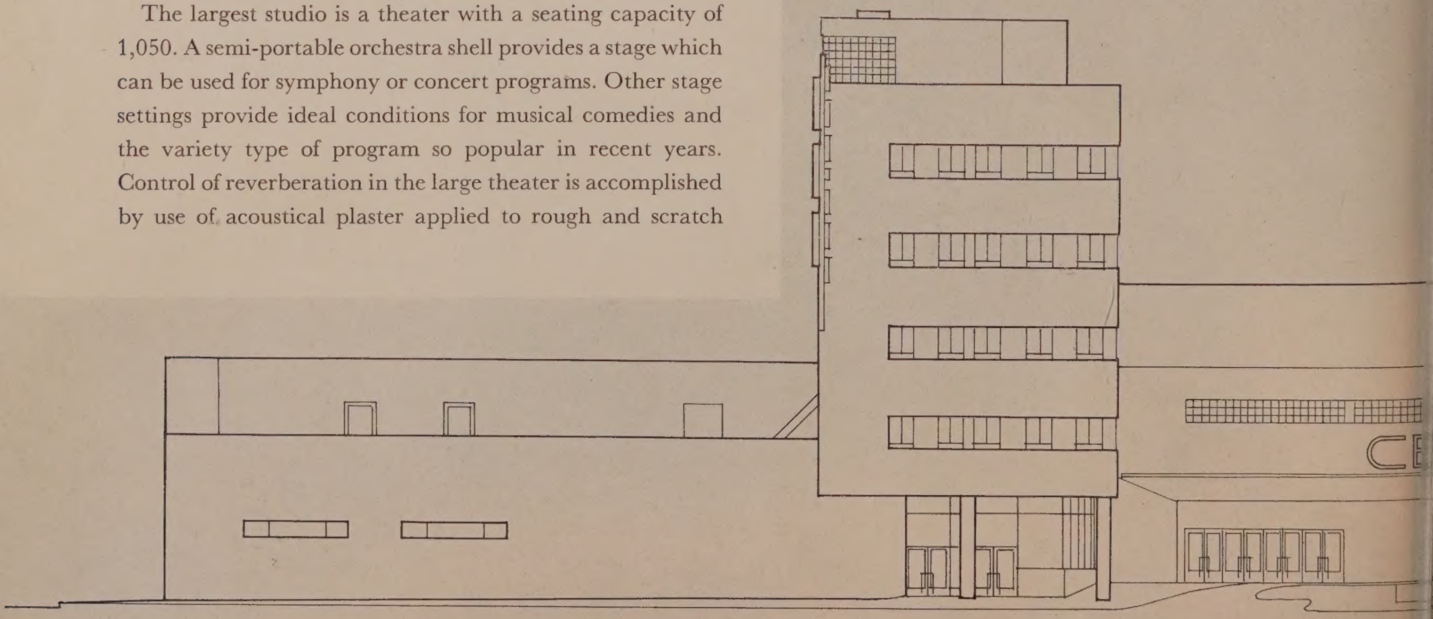
The main building is divided into three more or less separate structural masses: a towering office building, rectangular in shape, set on slender columns around the entrance; a low studio building, divided into individual, small units; and the low theater portion, devoted entirely to housing of the public. This latter portion has relatively high ceilings and no intermediate bracing floors.

Across a planted patio from this main group is a two-story structure housing CBS management, talent agency, a branch bank, other independent business firms and Radio Center Restaurant. A driveway from Sunset Boulevard circles the patio garden, passing in front of the large theater. A spur leads to an ample parking area behind the studios.

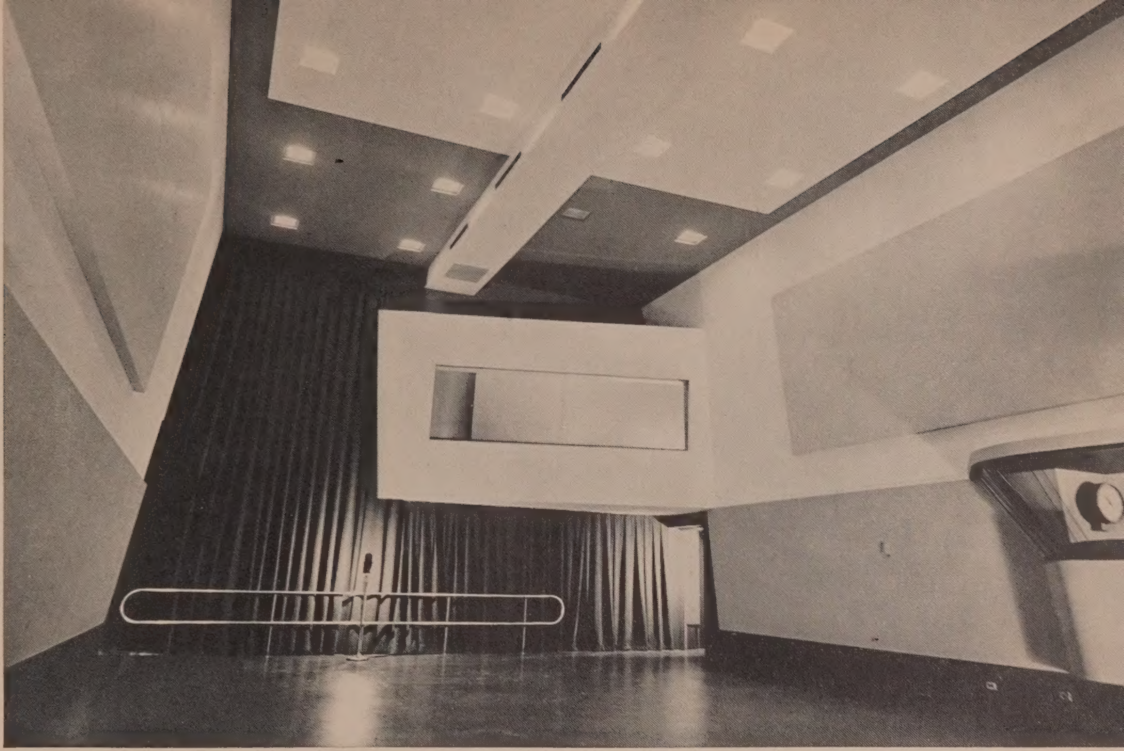
The entire group is built of reinforced concrete, with all facades fronting on the patio made bright with continuous horizontal bands of windows. Exterior walls, functioning strictly as structural and enclosing walls, are simply-formed panels without decorative detail of any kind. Choice of concrete as the medium of construction was obviously due to its amenability to seismic design, its natural economy and the high craftsmanship which has been developed for molding this plastic substance into architectural forms.

Of particular interest, therefore, is the manner in which the material of construction was employed in the structural design to offset earthquake stresses.

Examination of the foundation indicated the desirability of separating the building into three distinct structural units.



SOUT



Inclined walls for studio and theater halls throughout the building eliminate "room flutter." Acoustic treatment is applied to the walls and ceiling.

Other considerations, however, militated against complete separation of the office building and the low studio portion.

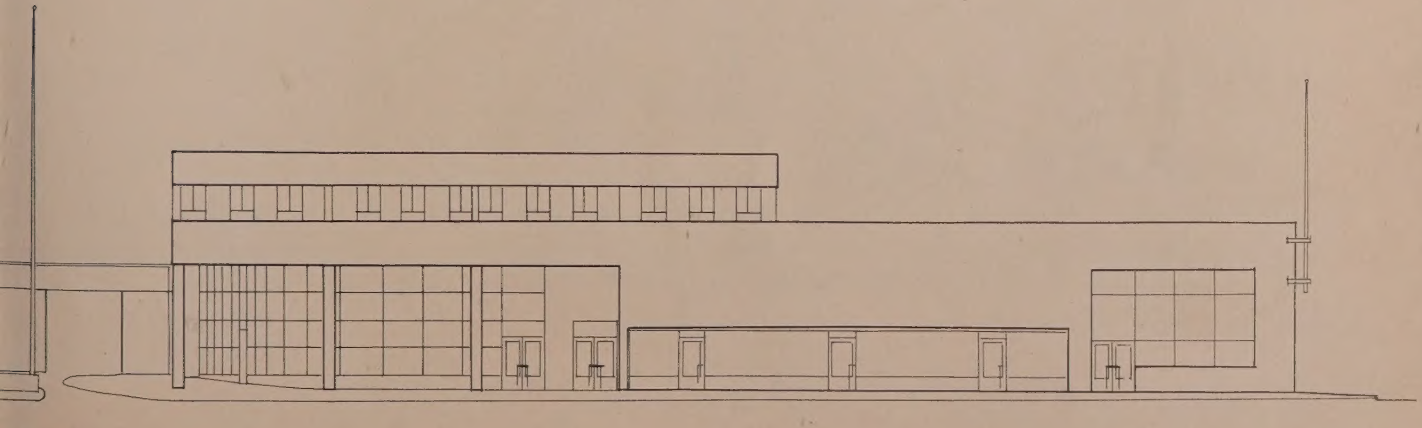
In an earthquake, the office building being tall and partly supported on columns which, for architectural reasons, had to be relatively slender, would sway freely. Not only that, but it would tend to twist, due to the flexible support around the entrance and the rigid support elsewhere. The low studio portion, on the other hand, would have an over-abundance of rigidity and earthquake resistance. The flat roofs would distribute the torsional forces easily and with something to spare. In other words, the office building was inherently too weak to stand alone, and the low studio portion had excess strength. The answer quite obviously was that the two should be combined.

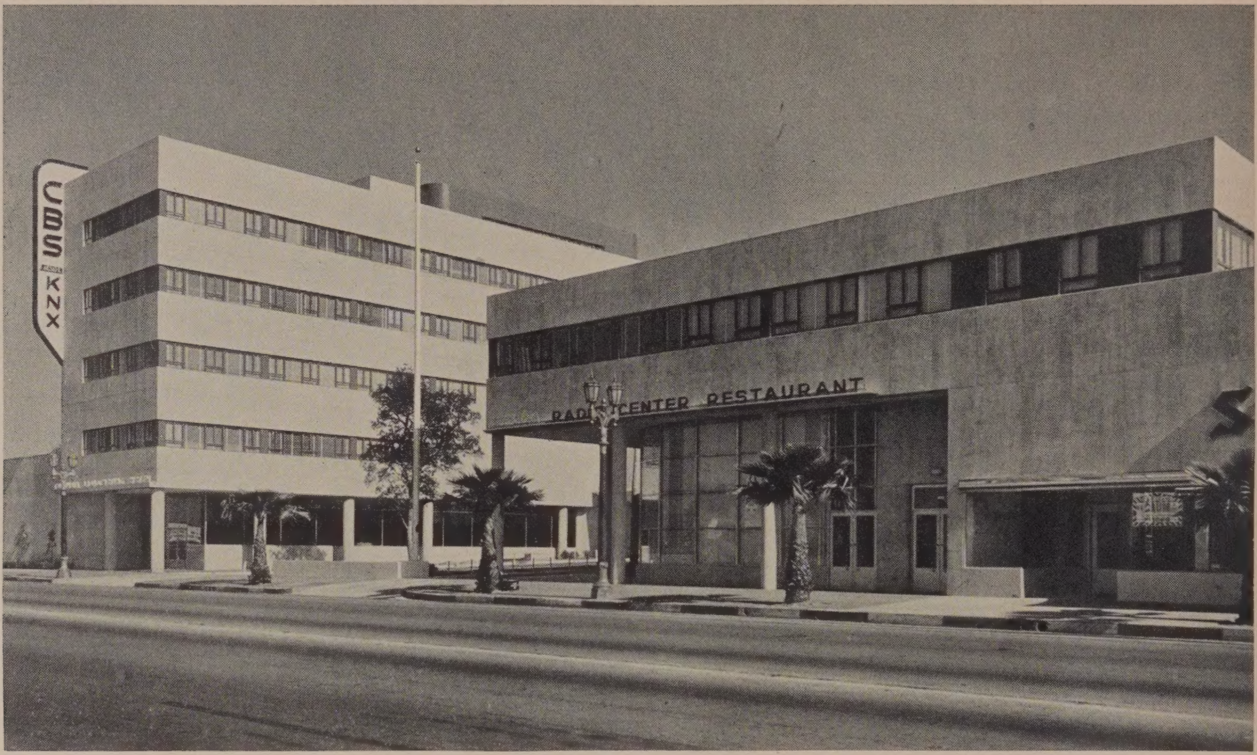
Curiously enough, once a combination of the office building and the low studio was decided upon, the very slenderness of the columns became a distinct advantage. The columns detach the office building from the foundations in so far as lateral forces are concerned, and thereby eliminate to a great extent conflicting stresses due to difference in amplitude between the units. In effect, they create a hinge.

Having decided to combine the two structural units, it was necessary to build both on a single mat foundation. This, incidentally, resulted in great economy due to elimination of the piles under the office building. Where the footings combine at different levels, a sloped connecting footing was used. This obviates "hammering" and eliminates sudden change of section and resultant concentration of stress.

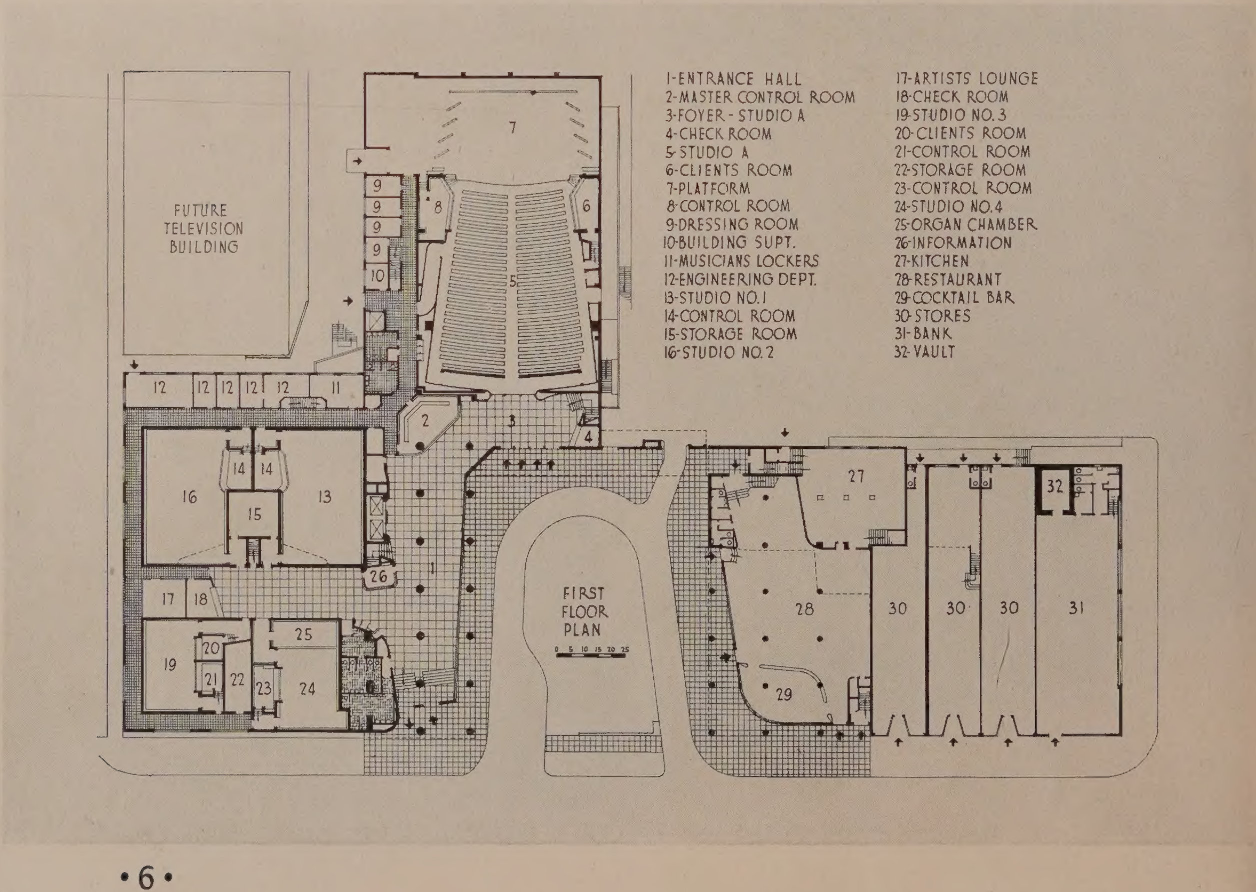
Since the studio roof for the most part connects with the office building floor at the third level, but steps down to the second floor near the entrance, it was found imperative to introduce a flying buttress from the third-floor level to the roof at the second floor. This greatly relieved "whipping" action of the office building in relation to the studio unit.

From the very start it was considered necessary to make the theater portion a completely separate unit. An 8-in.-





General view of the CBS plant. The radio workshop including offices and studios is at left. Building at right contains restaurant, branch bank and other business offices.



wide separation joint completely detaches it from the other structures. Proscenium walls and girder of the theater building are reinforced as a strong diaphragm, providing the necessary rigidity for transverse earthquake forces. Concrete buttresses under the roof girders were combined with them, thereby using the capacity of the buttresses to resist moment to reduce the size of the girders.

Solution of the structural problem was made comparatively simple due to the coordination of architectural and structural elements in planning the buildings. The architectural and structural requirements, however, demanded a very exacting craftsmanship for the construction of the building. The design made it mandatory that all walls be absolutely true, plane surfaces, and that all corners and angles be absolutely straight. The plane surface and straight line design on the exterior was carried through to interior design as well, which required extreme care in developing straight plaster walls and sharp corners and arrises, whether or not they were only to be painted or covered with a variety of materials used throughout the building.

Five-eighths plywood panels were used for exterior wall forms and as the architectural design required these panels to be used vertically rather than in the customary horizontal

A driveway circles the patio which opens onto a parking lot at rear.

The concrete floors, formed with metal pans, were covered with a variety of flooring materials, including rubber tile in public areas, linoleum in studios, offices and corridors above the first floor, asphalt tile in service corridors at grade and carpeting in audition rooms and executive offices.

Installations include oil heating, complete air conditioning, ample elevator service capable of getting the public in or out of the building without congestion, and a perfectly controlled lighting system with emergency throw-over circuit breakers so that all studios, passages and exits are illumi-

General Foods' Corn Mill

By J. Henry Maag, Architectural Engineer*

WHEN Prohibition went into effect, a large number of the corn mills which flourished prior to that time were, for obvious reasons, either dismantled or converted to other uses. Since then, no new corn mill has been built until General Foods Corporation erected the one at Kankakee, Illinois, this past winter.

The General Foods mill, occupying a 33-acre plot, is in the heart of the corn belt, in close proximity to the white corn supply which is the exclusive product of the mill, and not far distant from the company's main plant at Battle Creek, Michigan. A portion of the land on which it is built will be used as an experimental farm for corn growing.

The mill is a large structure 48x405 ft., 8 stories high with a full basement. Built entirely of reinforced concrete, the construction material and structural feature of the building are the basis of the architectural design. The continuous concrete spandrels and sash produce a clean-cut, pleasing exterior without resort to ornament in any form. Additional interest is given to the design by set-backs from the ends of the building.

A feature of the design is the two transverse expansion joints throughout the entire height of the structure which in effect divide the building into three separate units. Expansion joints were considered necessary due to the extreme variations of temperature in the locality.

The building rests on a rock formation which was encountered at a depth of about 4 ft. A large alumina content in the rock formation gave a soft, mushy appearance to the surface when wet, and when dry it spalled off, leaving a powdery surface. Despite the doubtful bearing quality of the rock when it was first observed, a load test proved that it would actually support many times the load to be imposed.

Completion of the mill was accomplished in record time. The first slab of concrete was placed in early September, 1937, and the finished mill was in operation on March 1, this year. All cement used in the building was standard portland cement.

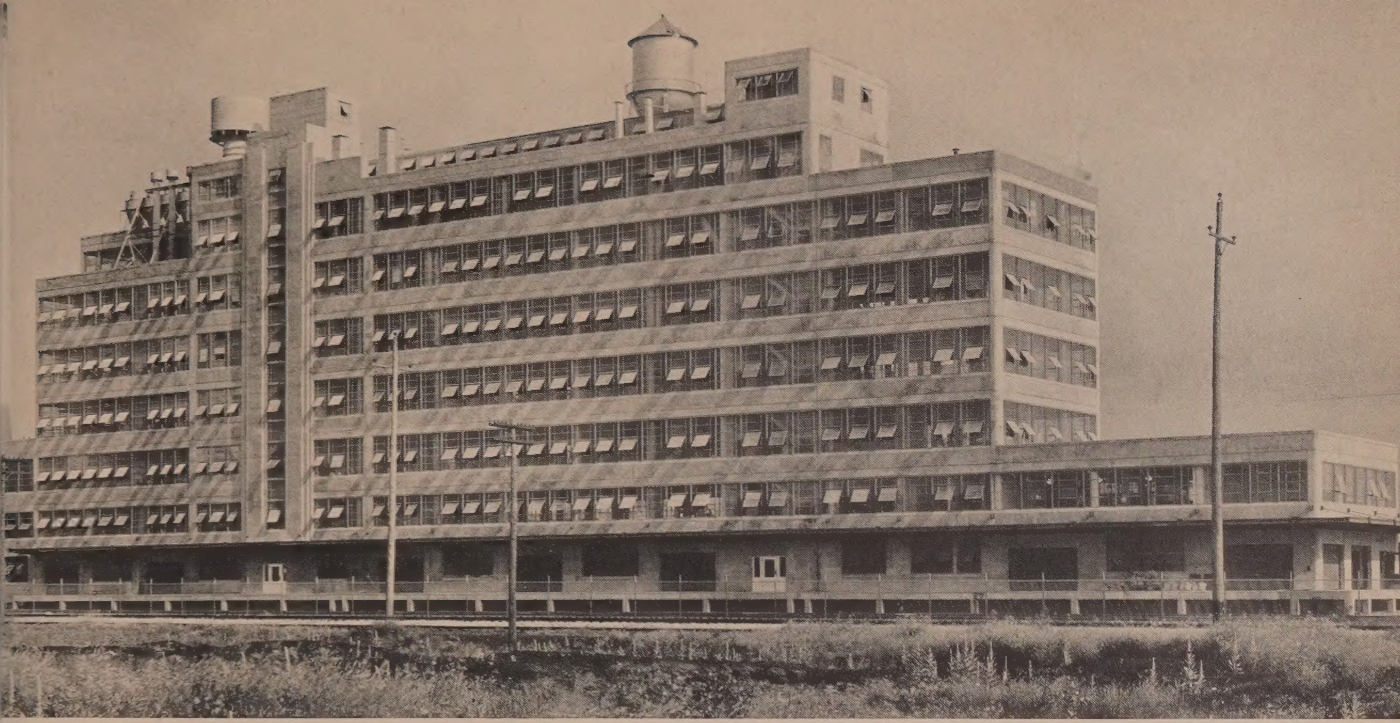
In order to keep columns to minimum dimensions, a 5,000-lb. concrete was used. Plywood was used for all forms to insure smooth surfaces. All floors are concrete with Kalman finish.

An important part of the plant is the 1,250,000-bu. raw corn storage—a battery of 24 concrete silos, each 24 ft. in

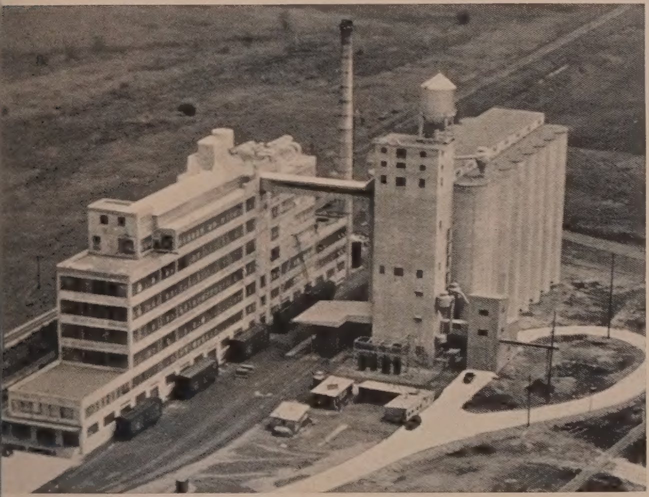
First big corn mill erected in U. S. since Prohibition was built for General Foods at Kankakee, Illinois, this [illegible] many-windowed structure, it was designed and built by the H. K. Ferguson Company, Cleveland.

---

*The H. K. Ferguson Company.



Smooth-formed concrete spandrels alternate with bands of windows to give the structure a pronounced horizontal feeling.



An aerial view of the plant shows the relation of the storage silos to the main building. The James Stewart Company designed and built the concrete silos.

diameter and 100 ft. in height. The elevator headhouse is equipped to deliver kernel corn from the hopper into the silos, reclaim it from the storage silos and convey it thence over a bridge to a house bin in the mill. Here the corn starts on its way to processing. Fifty-six bucket elevators in the mill feed the various machines which include 48 grinding mills. The plant is equipped to handle 20,000 bu. of corn per day, and is designed so that the capacity may be increased to 30,000 bu.

About 60 per cent of the corn delivered to the plant is processed and manufactured for the market at this mill. Products are hominy grits, corn meal, corn oil, brewer's flakes, and cattle food which is a by-product. The other 40 per cent of mill capacity is sent to the main plant at Battle Creek in the form of coarse grits—and this is the basis for the popular Post Toasties. Only white corn can produce the golden brown color required in this cereal.

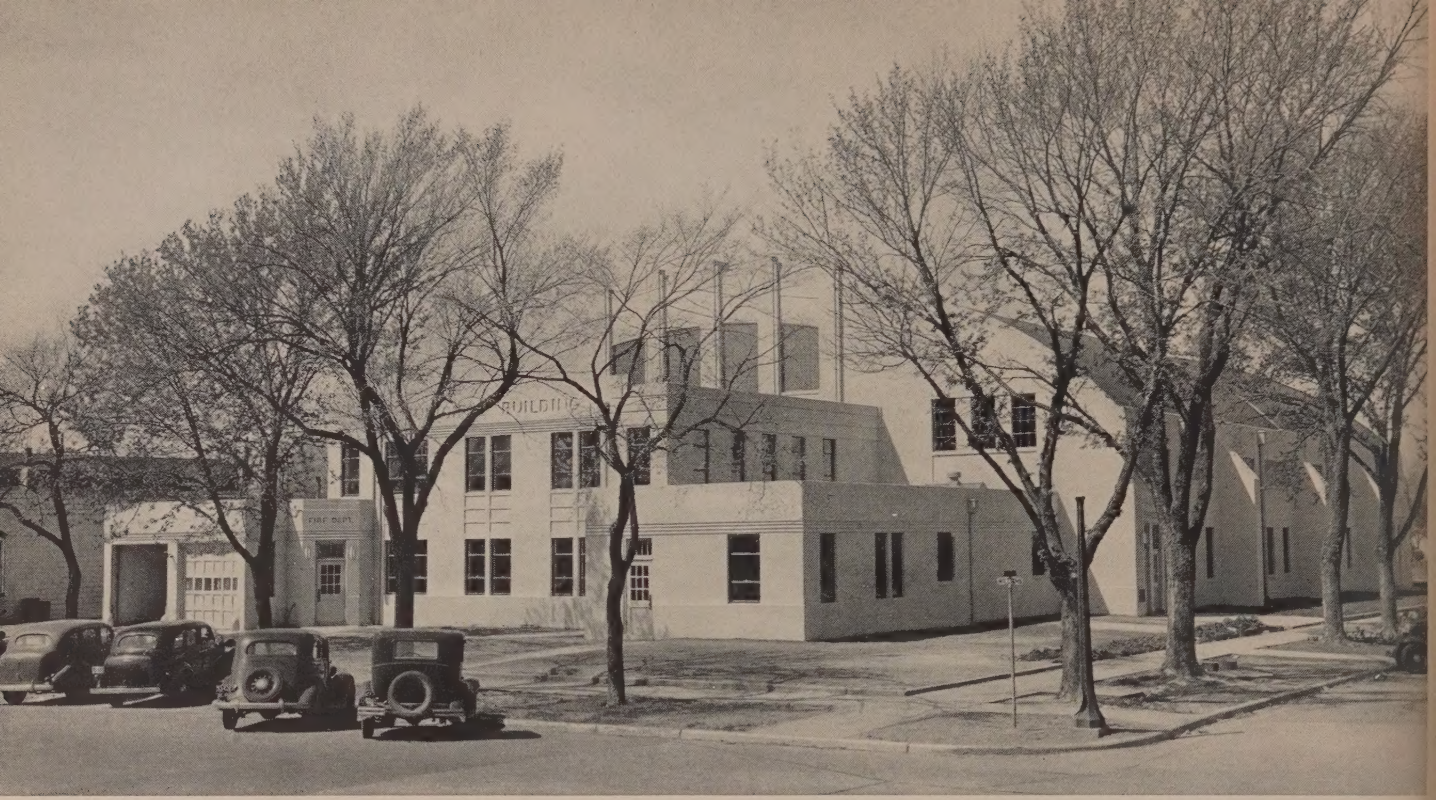
To handle the large amount of in and out shipping, a concrete loading platform occupies the entire length of the north side of the building. This platform is serviced by the New York Central Railroad which has more than 6,000 ft. of yard track around the plant, including the receiving tracks adjacent to the silos. Freight cars enter the yard at one end and leave at the other, the yard being so graded that little effort is needed to move the cars.

P. P. Pratt, western division engineer for General Foods Corporation, was in charge of laying out production equipment. All machines are of the most modern type, and are so arranged as to take full advantage of straight gravity flow.

Careful planning of all details of structure and equipment has resulted in an up-to-date plant, easy to operate, economical to maintain and assuring maximum cleanliness so desirable in the production of edible goods.

E. J. Grimmett was the owner's resident engineer throughout the construction of the building, and all the operation has been under executive supervision of R. R. Thomson, manager for western plants, for General Foods.

The H. K. Ferguson Company, engineers and builders, of Cleveland, Ohio, designed and built the plant. The battery of concrete silos was designed and erected by The James Stewart Company.



Keeping pace with its tradition for progressiveness, Great Bend, Kansas, has just completed a combination City Hall and Public Auditorium. R. J. Hamilton was architect and George Senne Construction Company, Topeka, was general contractor. Roberts & Schaefer Company, Chicago, designed and supervised construction of the Z-D roof over the auditorium.

Great Bend Auditorium

By R. J. Hamilton, Architect

EARLY explorers referred to the "great bend" of the Arkansas River as a landmark. Freighters, opening the Santa Fe Trail, converged at this point on their route to Santa Fe and the gold fields of California. Immigrants passed here in covered wagons. Great Bend became a cattle center and later one of the largest wheat-producing centers in the United States. Within the past five years, the city entered its third economic phase when great oil-producing areas were developed and the population doubled.

Since pioneer days, Great Bend has not only been the commercial hub of a vast trading territory, but has been looked upon as the social and recreational center as well. That is why a group of foresighted business men realized that, with the rapid progress due to the oil industry, the city had to live up to its tradition for progressive adaptation to changing modes of life. One of the greatest needs in this respect, they agreed, was a substantial municipal building—and more, a public auditorium to provide facilities for the growing cultural and recreational interests of the people.

Kansas tax limitation law made it impossible to vote more than $125,000 in bonds for the proposed building, and also limited the levy for maintenance of such a structure. It became immediately apparent that, without scaling down on required accommodations and the envisioned impressiveness of the structure, a more economical type of construction than that first anticipated would have to be sought.

Architectural concrete was then considered. Careful study revealed that this modern material could produce the type of building desired as far as appearance and structural soundness were concerned and within the cost limitation. Accordingly, the City Council proposed a bond issue which specifically stated that the structure should have a seating capacity of 2,500 and should include an auditorium, a fire department, police department, jail and city offices—all for $125,000 which had to include purchase of land and all expense. The bonds were voted, and the low bid on the all-concrete building was $110,886, including lighting, heating and plumbing—a cost of less than 16 cents per cu. ft.

Approximately 115x210 ft. over-all, the building is divided into two definite sections. The front is an office building directly connecting with the auditorium which is 112x130 ft. in plan. The unusual feature of the auditorium is that it is spanned by the first concrete "Z-D" roof to be built west of the Mississippi. Due to the use of the same material, the two parts of the structure harmonize in an ensemble of modern lines and masses.

The municipal office section contains ample facilities for conducting city business, and in addition provides a large meeting room for Boy Scout and other local club activities. The auditorium, with its clear span and freedom from any interior obstacles to vision in any quarter of the hall, has a large stage for dramatic, musical and cultural programs, and by removing the floor seats is adapted to use as a gymnasium for indoor sports that can be witnessed by large numbers of people in permanent tiers of seats.

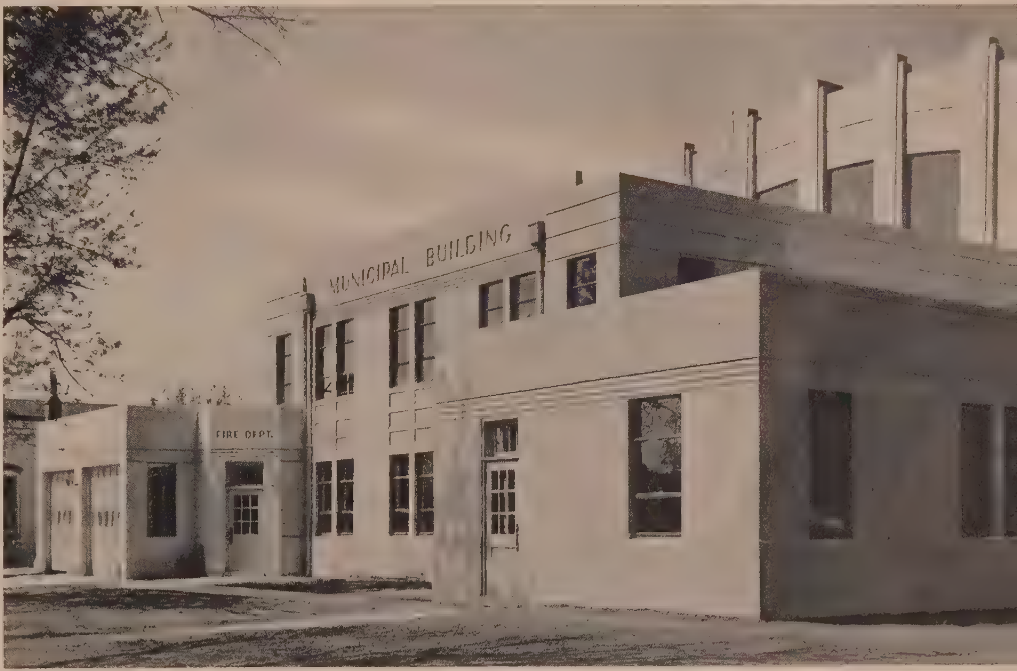
Acoustical material in the ceiling of the hall, which was laid on the roof forms before the concrete was placed, affords splendid sound control, effective insulation and an attractive surface for decoration.

The architectural concrete walls are 10 and 12 in. thick, formed against ordinary sheathing which gives decided texture to the wall. The finish is portland cement paint. Glass block were used in long narrow horizontal panels high in the walls of the auditorium. These windows provide excellent illumination above the tiers of permanent seats and have a decorative quality. Plaster molds were used sparingly for simple ornamental details which were cast integrally with the walls of the building.

Although the water table at Great Bend is frequently very near the surface of the ground, the two basement sections under the building are dry at all times. No waterproofing treatment of the concrete walls was considered or found to be necessary.

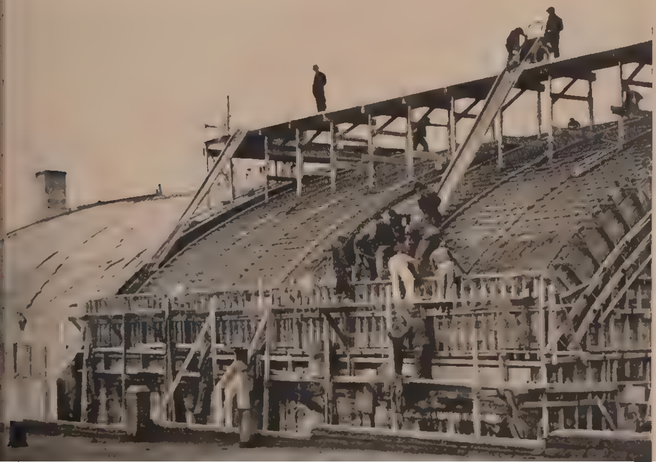
Despite the limited funds available, the use of architectural concrete made an impressive building possible, a building that is highly satisfactory to the citizens of Great Bend. The structure vindicates the determination of those progressive business men who said: "It can be done."

G. Hartwell, Wichita, was engineer for the project and George Senne Construction Company of Topēka was the general contractor. Roberts and Schaefer Company, Chicago, designed and supervised construction of the Z-D roof.



City offices are located in a two-winged unit at the front of the structure. The auditorium is at the rear. Wide form boards left an impression of joint lines in the surface.

ncrete was delivered in pneumatic-
ed buggies and chuted to the place
deposit for the Z-D roof.



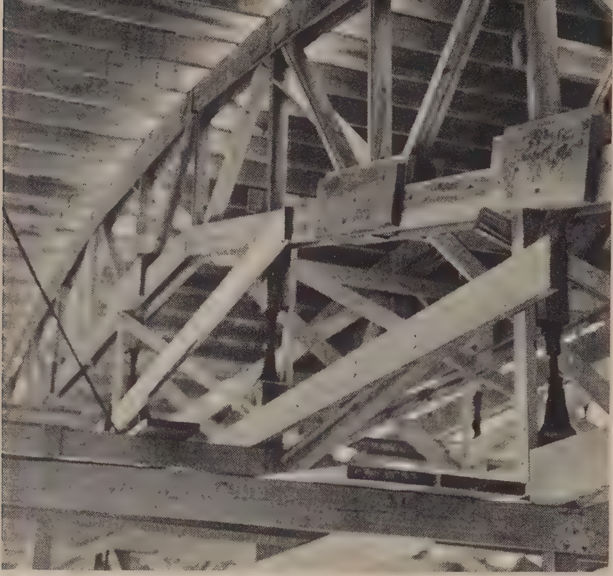
Great Bend's Z-D Roof

By Anton Tedesko*

THOSE familiar with examples of concrete shell roofs in this country and in Europe will recognize that the Great Bend, Kansas, auditorium roof is not unlike other

---

*Engineer of Design, Roberts and Schaefer Company.



Centering for the Z-D roof forms was supported on screw jacks which also served to lower centering slowly.

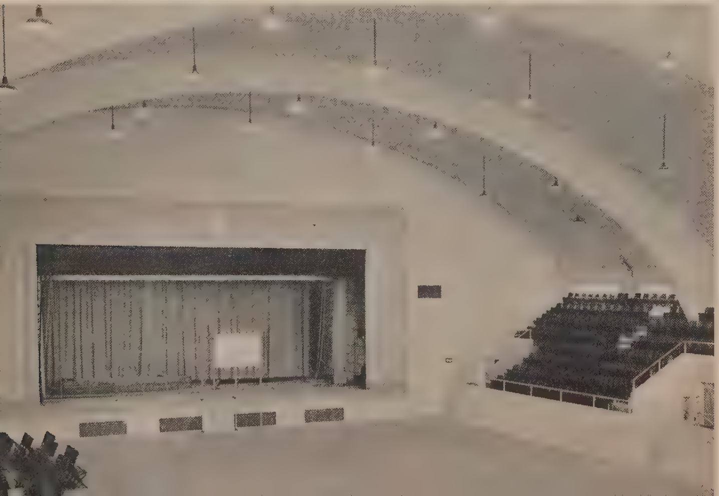
Z-D roofs in many respects. Yet, because this system of construction is still comparatively new in America and because no two jobs are identical, a brief discussion of this particular project should be interesting.

Original plans for the roof were prepared for a non-firesafe construction with unprotected steel framing and wood joists and sheathing. Alternate bids showed only a slight increase in cost for an all-concrete roof, and the total cost of the building, due to the saving effected by the substitution of architectural concrete walls, was well within the cost limit set by the City Council. The owners therefore decided to have a completely firesafe building.

The auditorium roof shell is a concrete slab 2⅝ in. thick, curved to a radius of 90 ft., thus forming a cylindrical pipe-like girder. Along the side walls the shell is stiffened by an increase in thickness and curvature and by proper reinforcing determined according to shell theory. (*See discussion of similar construction on* Hershey Sports Arena, ARCHITECTURAL CONCRETE, *Vol. 3, No. 1, 1937, pp. 3 to 11.*)

The large cylindrical girder is stiffened against deformation by arch ribs 32½ ft. apart, and by reinforced concrete walls at each end of the auditorium. The arch ribs were designed as 2-hinged frames of 117-ft. theoretical span, with semi-hinges below floor level. Since the soil could not take the side-thrust of the frames, tension ties were provided between the foundations.

The interior of the auditorium is treated simply and the arch ribs give a graceful sweep to the roof.



An expansion joint is located along the transverse centerline of the building where a double arch rib is provided. Bleacher construction is independent of roof supports and was built after the completion of the roof structure. Wood scaffolding and formwork were provided for half the roof area. Because a stiff mixture of concrete was used, no top form was necessary.

Local aggregates are deficient in coarse material, making an adjustment of the grading necessary. Aside from a considerable addition of coarse gravel, fine brick screenings were added because many of the fine particles were washed from the sand. High early strength cement was used and the concrete was placed with vibration. Specifications required a 3,500-lb. concrete.

Using a stiff mix, no top form was necessary. The concrete was finished with wood floats.

Each roof section from the springing line upward was cast in one continuous operation, requiring about 15 hours. Decentering was accomplished by the slow, gradual lowering of screw jacks placed between the scaffolding and the formwork. As horizontal thrust developed at the arch footings, the tension ties were put under stress by means of hydraulic jacks so that no horizontal movement of arch footings could take place. When the forms had been lowered clear of the concrete, the scaffolding was moved into position for placing the next section.

Dr. Pepper's well-known "
hour clock" is the tower motif
the company's new bottling pla
at Fort Worth, Texas. Hube
Hammond Crane was the arch
tect, and Thomas S. Byrne, Inc
the general contractor.

New Plant for "Dr. Pepper"

By Hubert Hammond Crane, Architect

DEEP-DYED southerners have daytime drinking habits that vary widely with those of other sections of the country. At mid-morning and mid-afternoon—and sometimes more often—there is a tremendous urge for tasty libation; so man, woman and child, they drop what they're doing and drink of something refreshing. And many times that "something" is a sparkling glass of red-brown Dr. Pepper—a non-alcoholic pick-me-up for lagging spirits.

For several years the Dr. Pepper Bottling Company of Fort Worth, Texas, has been operating in a plant which, by virtue of the increasing popularity of the product and amazing growth of business, had become more and more outmoded in appearance, utility and storage convenience. Consequently, early in 1937 Henry B. Dorris, president of the company, came to us with a problem to solve. The problem was to secure a centrally located distributing point for a direct process product and to design a building with maximum advertising value at minimum maintenance cost, while permitting future expansion or possible conversion to other usage.

Various proposed locations were inspected and analyzed, and a suitable one finally located. This site, although irregular in shape, is located on a main north-south thoroughfare, but a few blocks distant from the heart of the business district, and one block removed from what will shortly become the main east-west highway through Fort Worth. It is also adjacent to available trackage and, though this is not an important advantage at present, it is considered

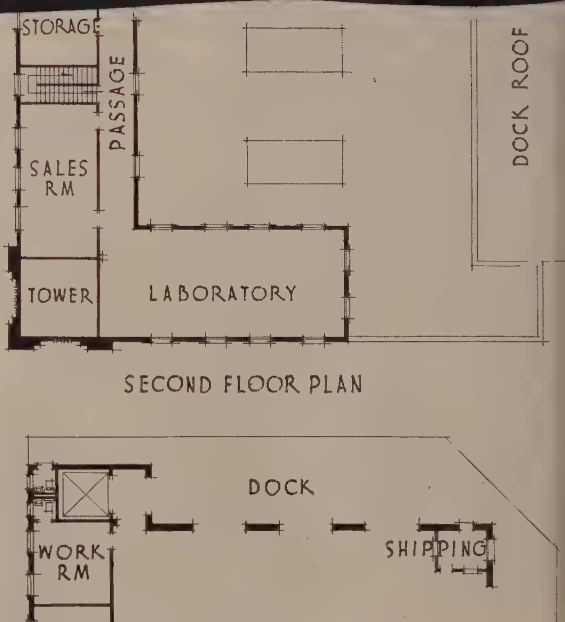
valuable in view c
building for other

Because the ow
economically main
satisfactory use of
office building for t
we decided on the
Dr. Pepper job, thu
tion of a building which very likely might outlast the owner's needs. Consequently, it was decided that permanent signs or identifications should be omitted from the structure.

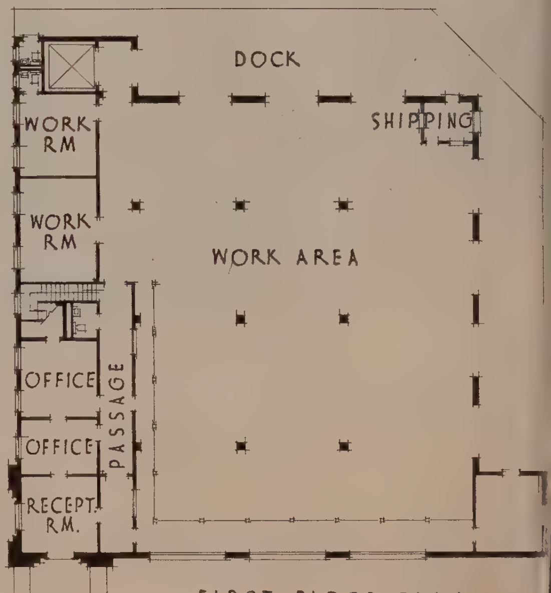
The work area where bottling machinery is located was made large enough for additional equipment to more than triple the present required capacity. This space may be easily converted into retail sales or other display space. In order to keep construction cost at a minimum, yet achieve the desired appearance in keeping with the material, no delicate ornament was used, and the structure finally conceived is a simple, modern grouping of masses.

One of the most interesting parts of the project was developing the advertising features of the building, and this was done by what is called, in advertising parlance, a "tie-in." The company carries on an extensive radio campaign which features the slogan: "When you drink a Dr. Pepper you drink a bite to eat," and their outdoor advertising bears a clock face which shows only the hours 10, 2, and 4.

At our suggestion, the musical director of the radio program composed a melody to which the slogan was sung on the air for a period of about a year before completion of the building. This advertising, therefore, immediately suggested the use of a clock as the principal decorative motif of the structure. The tower was selected as the most advantageous place for the clock which operates a synchronized chime system that plays the theme melody at 10 a.m., 2



SECOND FLOOR PLAN



FIRST FLOOR PLAN

and 4 p.m., followed by a deep vibrant bell striking the hour. This, we believe, is the first time in this part of the country that an advertising feature of a building housing an industry has been so closely allied to other advertising mediums used by the owner.

The building is entirely reinforced concrete from spread footings to floors, walls and roof. Large areas of smoothly-formed concrete contrast pleasantly with generous fenestration, and detail is confined chiefly to precast grilles, offsets and flutes in the tower.

The walls were cast in forms made in 4x8-ft. panels built of 1x6-in. No. 2 yellow pine boards S4S and a ¼-in. plywood liner. Only No. 1 grade kiln-dried yellow pine was used for studs and walers because the pieces are straight and remain so better than a poorer grade. Panels were butted on single studs to insure smooth joints. The forms were first built to window sill level, then removed and set to the level of the window heads. The next lift of forms was built to second-floor level, but the third run of concrete extended only from the window heads to the bottom of the beams supporting the second floor. Beams over the large openings at the front had sufficient depth to allow a construction joint at the bottom of the floor beams.

When the contractor had completed construction to second-floor level, he was of the opinion that money could be saved by erecting the forms over a larger contact area. For this reason the entire second story was formed at one time and the lift of concrete was from the second-floor line to the beam bottoms that support the roof.

Beveled pockets approximately 8x4 in. were cut in the sills in order that concrete under the window might be properly tamped into place. When areas under windows were completely filled with concrete, the beveled block was securely nailed into place.

Horizontal and vertical fluting and decorative treatment around the door and window of the tower were formed with white pine moldings. A horizontal rustication on the west side of the building came at the second-floor level and proved a splendid place to make a construction joint.

D. L. Womack, construction superintendent on the job, detailed all the forms on a drawing board in the construction office, and one may see from the accompanying progress photograph how effective this practice was in producing good quality formwork. All forms were well made and were lined up straight and tight. The contractor definitely feels that the detailing of the forms was responsible for a substantial saving in cost.

The forms were used an average of five times. Those still in fair condition after the job was completed were stored at the contractor's yard for possible future use. These forms were cleaned and oiled each time after stripping.

At the suggestion of the contractor and with approval of the architect, all square corners in the exterior of the building were eliminated by the use of ¾-in. chamfer strips which provided durable corners and minimized the possibility of leakage at these points.

A pull-out type of tie was used and proved very satisfactory. All ties were set in plumb-lines so they would not interfere with the canvas curtain that was dropped down inside the forms to protect the outer face from splash. Carpenters were careful to place ties exactly at right angle to the wall so they would not foul when being pulled.

Hand puddling was used in preference to vibration, but in addition to tamping, laborers tapped the studs with rubber hammers to assist in reducing the number of small water pockets. The concrete was made with a minimum of 5½ sacks of cement to the cubic yard and was designed for a 5 to 6-in. slump with not over 7 gal. of water to the sack of cement. All concrete was placed from buggies in shallow, uniform layers.

There were no plaster mold details on the building. The numerals and hands of the clock are wood, and the grilles are cast stone, manufactured by a local plant.

The entire exterior was finished with two coats of white cement paint. Interesting color accents are the window trim, the numerals and hands of the clock which are painted red.

The inside was finished by furring with ¼-in. pencil rods and ¾-in. channels over which was applied metal lath and plaster. Suspended ceilings were used in the reception room, offices and downstairs work rooms. All other ceilings are exposed concrete finished with white portland cement paint.

Completed in 70 days of working time at a cost of $66,000 or a cubic foot cost of 28½ cents, the new Dr. Pepper building is satisfactory to both the owner and the architect. Robert Lealand Hunter, who is associated with the writer, was structural engineer and designer. Thomas S. Byrne, Inc., of Fort Worth, was general contractor.

Two coats of white cement paint produced a gleaming, durable finish which does not obscure the faint impression of the form boards.

Architectural CONCRETE

ARCHITECT · ENGINEER · CONTRACTOR

IN THIS ISSUE

The Studio walls of CBS are OUT OF PLUMB, says WILLIAM LESCAZE (page 3) who also explains why . . . Not so good for the NOBLE EXPERIMENT, but fine for corn flakes, thinks (page 8) J. HENRY MAAG about a mill in Kankakee . . . Kansas law kept the cost down, but not the QUALITY, says (page 10) R. J. HAMILTON . . . Only THREE HOURS make any difference on the big clock described (page 13) by HUBERT HAMMOND CRANE . . . Four pages of INDUSTRIAL BUILDINGS (pages 17 to 20) for your A.I.A. files . . . MANY BATTLES are memorialized, says (page 21) S. C. P. VOSPER, by the new Goliad Museum . . . W. F. RUCK and A. C. ROBINSON discuss (page 25) widely distant SCHOOLS FOR THE CRIPPLED . . . The picture of this building, according to ZARA WITKIN (page 28) is even on tractors . . . PONY EXPRESS TO AIRLINER, a short saga (page 30) by LUKE HAHN . . . To give the kids a SENSE OF PRIDE was RICHARD C. MURRELL'S idea (page 32) about this school . . . WILDCATS, says W. ADDISON McELROY (page 34) now have a better chance to amount to something.

Published by
PORTLAND CEMENT
ASSOCIATION
33 West Grand Avenue
Chicago

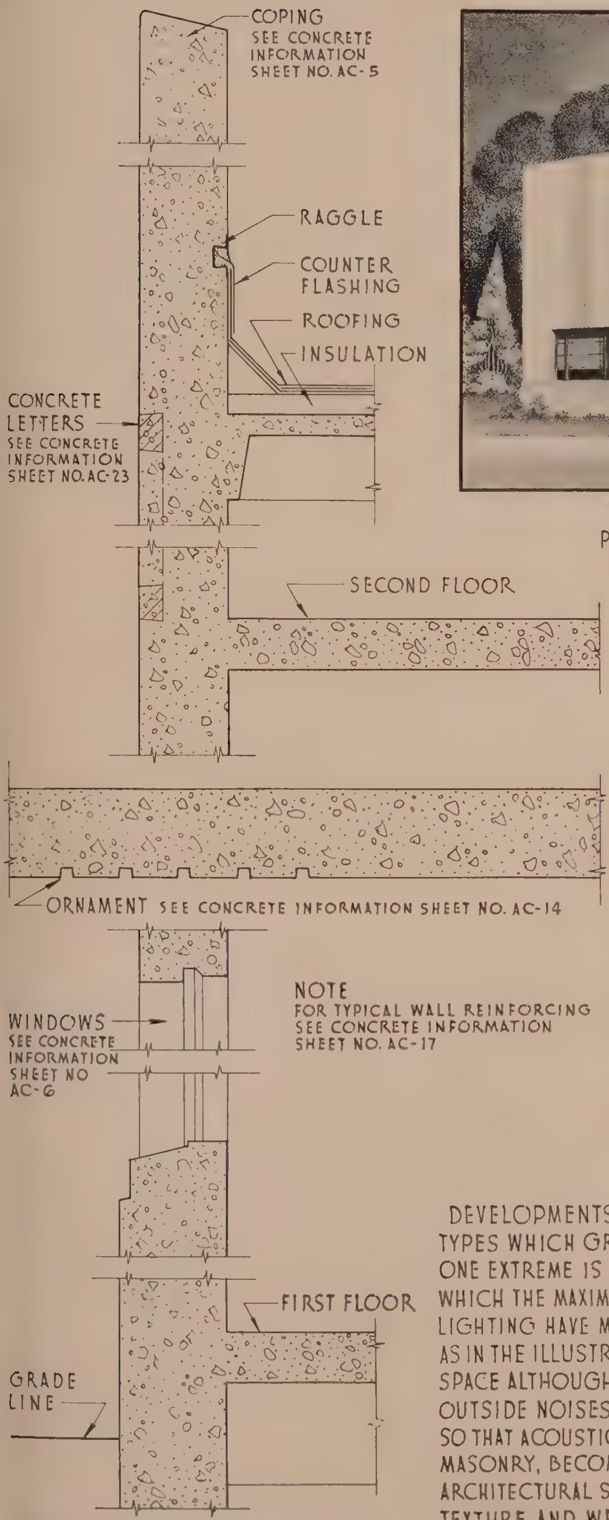
Concrete and the New Architecture

STUDENTS of architecture are taught that the distinctive styles and forms of the past were created, not by the whims and fancies of architects, but because those designers adapted themselves successfully to the advantages and limitations of available building materials. We have been wondering for some time how soon objective study of the architectural forms now generally called "modern," would reveal that the new architecture had an affinity for any particular modern building material.

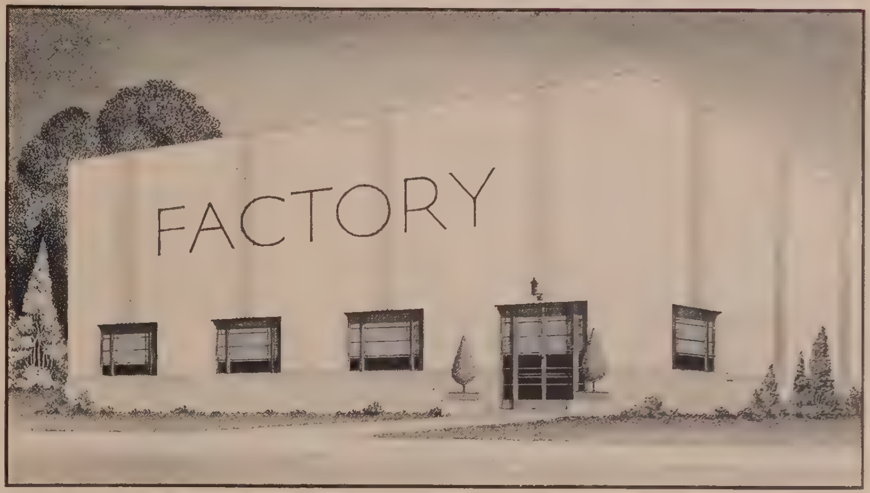
Now comes F. Lassere, at present writing a series of articles on modern architecture for the *Journal* of the Royal Architectural Institute of Canada, with an interesting idea. He writes:

"Reinforced concrete has walked hand in hand with the new architecture. They have shaped and helped each other. Because of its plastic qualities, its great strength, and its clean, monolithic, shell-like character, it (concrete) can, best of all the new structural materials, be formed and molded into the aesthetic vision of the modern architect. Its surface treatment, whether left exposed, grooved, stuccoed, tiled or treated in a multitude of other methods, offers an immense and exciting field for research and variety. Its application to all forms of buildings is equally successful, and with the help of scientific experiments, it will gradually be perfected into one of the, if not the, most practical, economical and aesthetically satisfying building material."

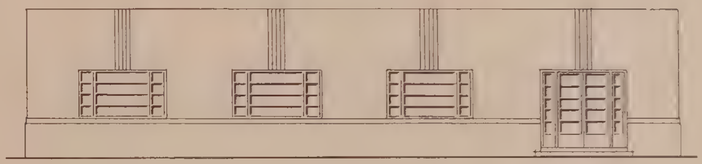
INDUSTRIAL BUILDINGS


COPING
SEE CONCRETE INFORMATION SHEET NO. AC-5
RAGGLE
COUNTER FLASHING
ROOFING
INSULATION
CONCRETE LETTERS
SEE CONCRETE INFORMATION SHEET NO. AC-23
SECOND FLOOR
ORNAMENT SEE CONCRETE INFORMATION SHEET NO. AC-14
NOTE
FOR TYPICAL WALL REINFORCING SEE CONCRETE INFORMATION SHEET NO. AC-17
WINDOWS
SEE CONCRETE INFORMATION SHEET NO AC-6
FIRST FLOOR
GRADE LINE

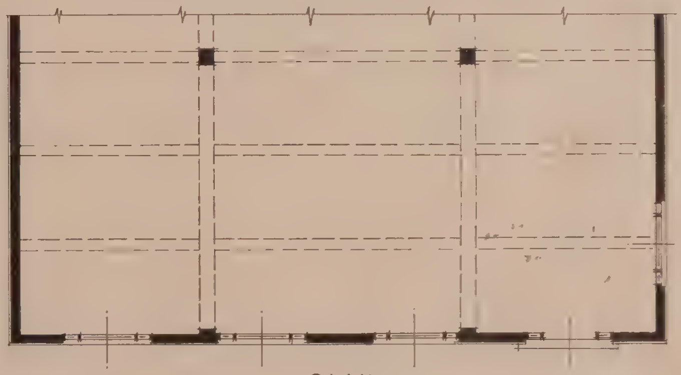
WALL SECTION THRU FRONT



PERSPECTIVE OF TWO STORY BUILDING

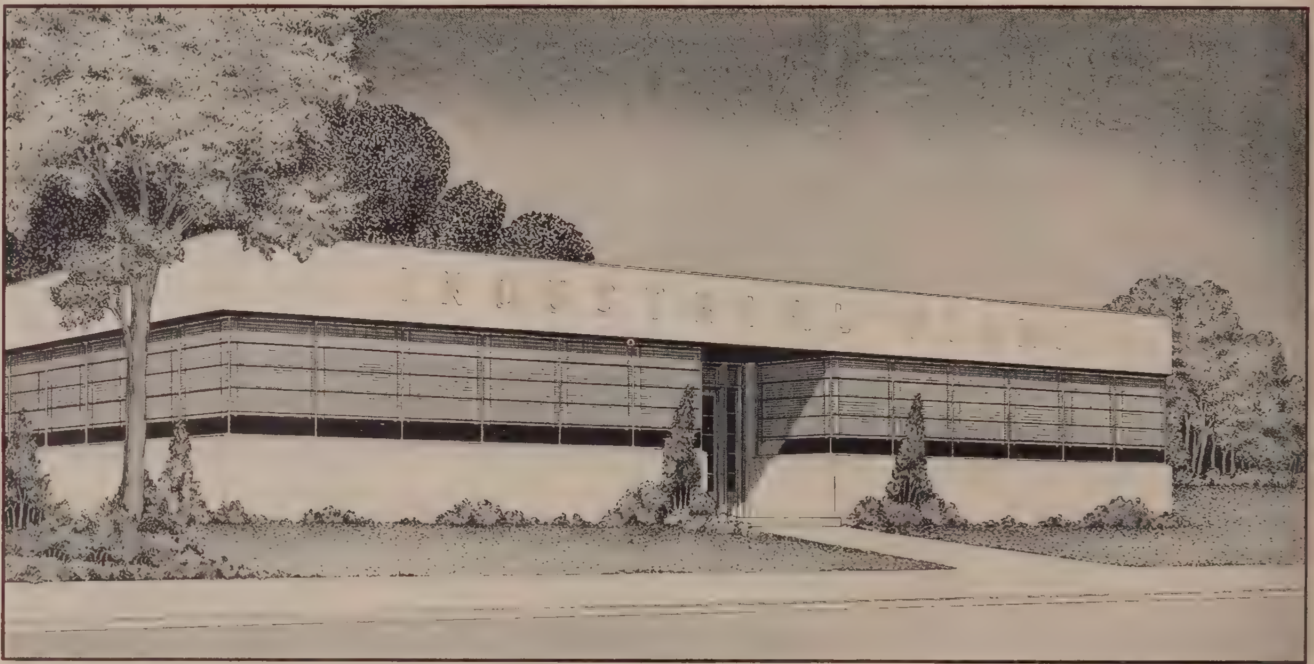


ELEVATION OF ONE STORY BUILDING

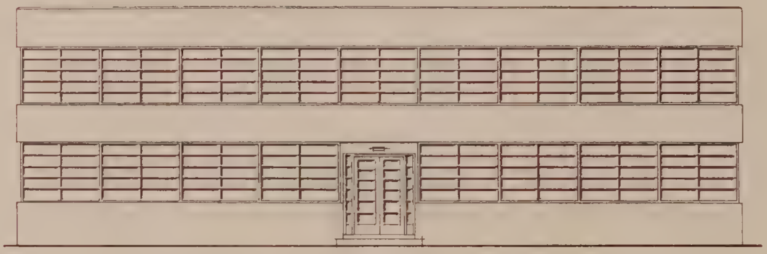


PLAN

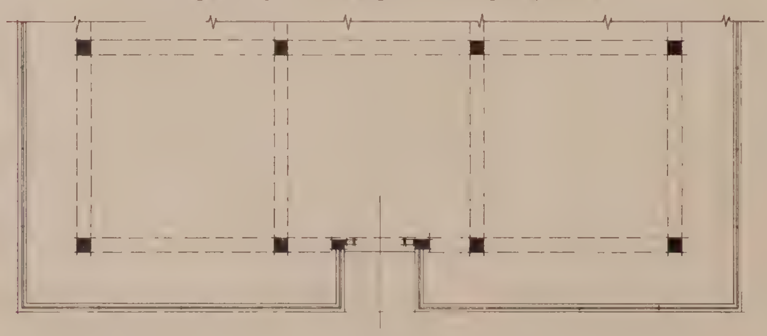
DEVELOPMENTS IN MODERN INDUSTRIAL BUILDINGS HAVE LED TO TWO EXTREME TYPES WHICH GREATLY INFLUENCE THE ARCHITECTURAL AND STRUCTURAL DESIGN. AT ONE EXTREME IS THE WINDOW-LESS BUILDING, AT THE OTHER THE DAYLIGHT BUILDING IN WHICH THE MAXIMUM WALL AREA IS GLAZED. AIR CONDITIONING AND IMPROVED ARTIFICIAL LIGHTING HAVE MADE THE WINDOW-LESS OR NEAR WINDOW-LESS BUILDING PRACTICAL. AS IN THE ILLUSTRATION SHOWN, WINDOWS ARE FREQUENTLY PROVIDED IN THE OFFICE SPACE ALTHOUGH ENTIRELY OMITTED IN THE FACTORY SPACE PROPER. EXCLUSION OF OUTSIDE NOISES IN THE WINDOW-LESS BUILDING MAKES INSIDE NOISES MORE NOTICEABLE SO THAT ACOUSTICAL TREATMENT, FREQUENTLY UNPLASTERED LIGHT-WEIGHT CONCRETE MASONRY, BECOMES ALMOST A NECESSITY. ABSENCE OF WINDOWS CALLS FOR CAREFUL ARCHITECTURAL STUDY OF THE LARGE SOLID WALL AREAS. INTERESTING SURFACE TEXTURE AND WELL CHOSEN DETAIL INEXPENSIVELY FORMED WITH WOOD OR PLASTER WILL RELIEVE AN OTHERWISE MONOTONOUS EXPANSE OF WALL.



PERSPECTIVE OF ONE STORY BUILDING

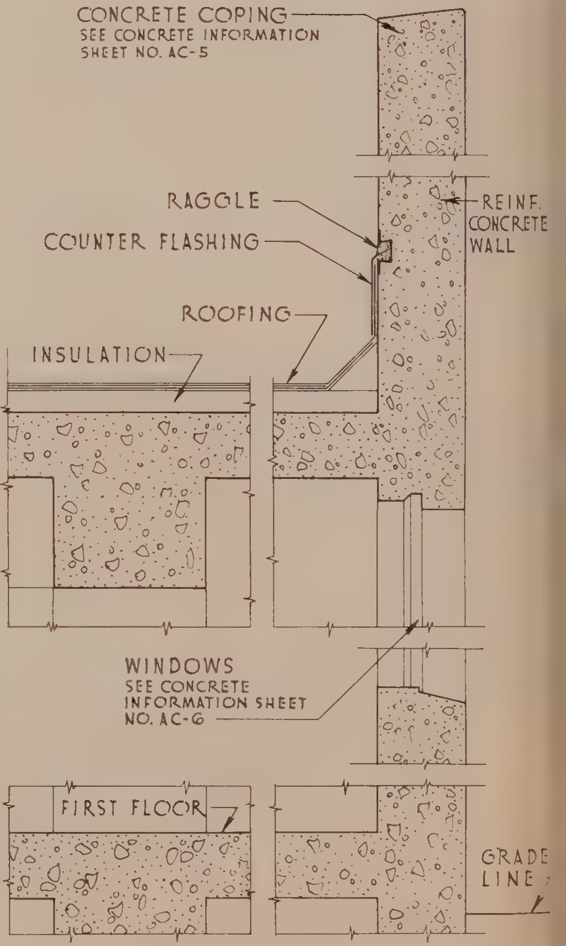


ELEVATION OF TWO STORY BUILDING

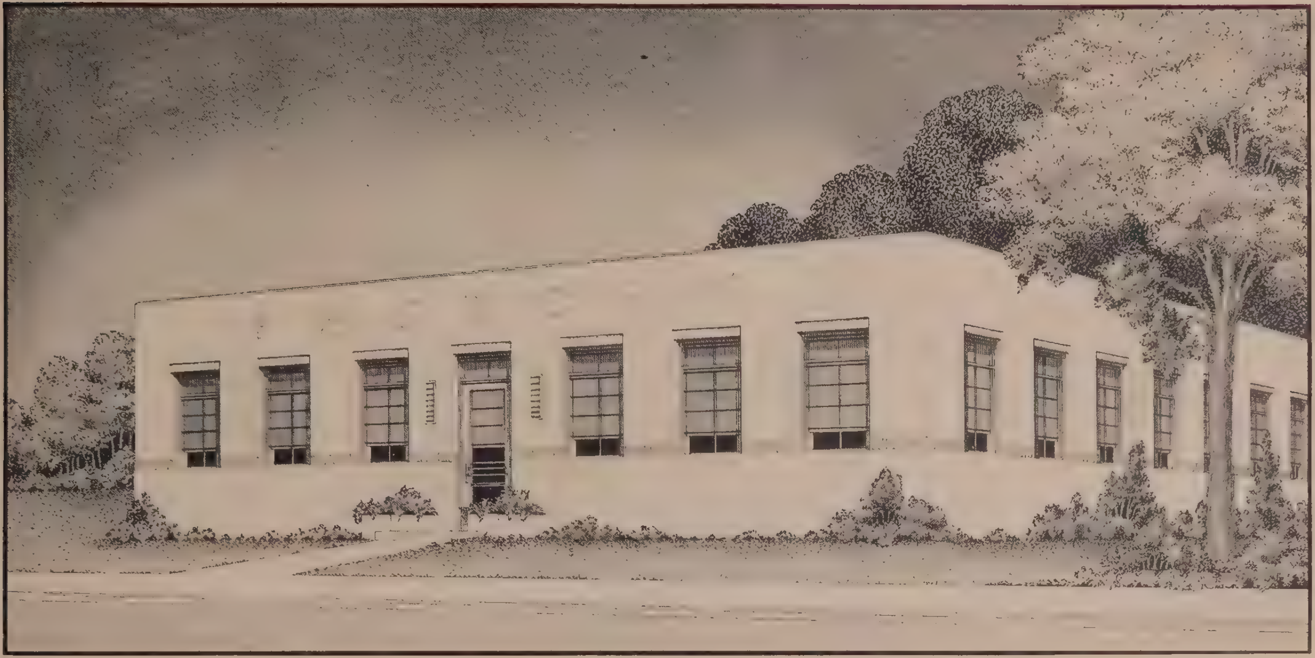


PLAN

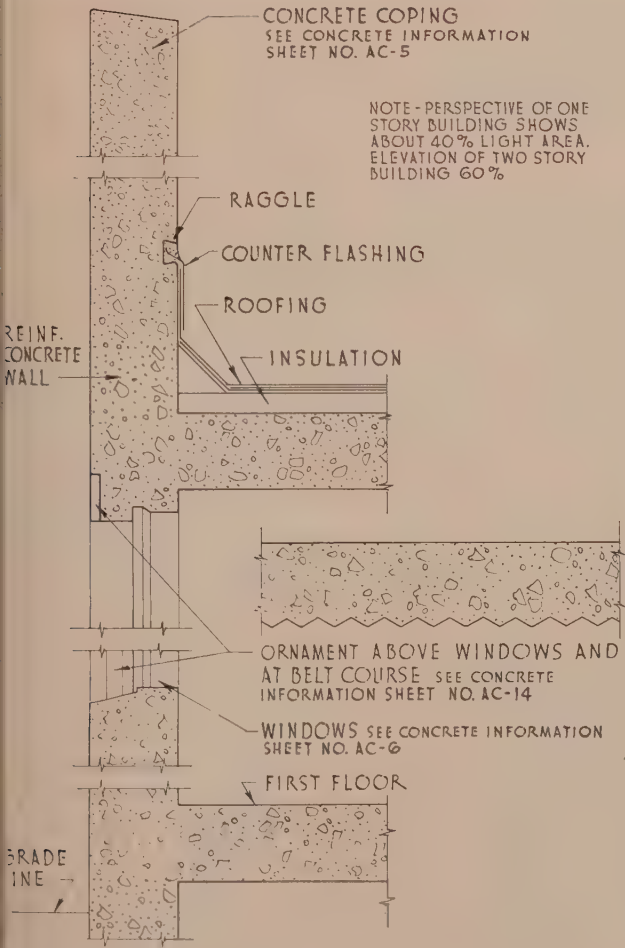
THE DAYLIGHT TYPE BUILDING WITH CONTINUOUS GLAZING INSURES THE MAXIMUM AMOUNT OF LIGHT UNIFORMLY DISTRIBUTED. WINDOWS SHOULD BE CARRIED UP TO THE UNDERSIDE OF THE FLOOR FOR GREATEST EFFECTIVENESS. DIFFUSING GLASS IN THE TOP PANES AND A LIGHT COLORED CEILING ARE ALSO BENEFICIAL. WALLS SUPPORTED ON A REINFORCED CONCRETE FLOOR SLAB CANTILEVERED FROM THE EXTERIOR COLUMNS WHICH ARE SET BACK FROM THE WALLS ARE PARTICULARLY ADAPTABLE TO THE DAYLIGHT FACTORY. SMOOTH SURFACES OR A BOARD MARKED TEXTURE EMPHASIZING THE LONG HORIZONTAL LINES OF THE SPANDRELS CONFORM WELL WITH THE USUAL ARCHITECTURAL DESIGN. EACH SPANDREL SHOULD BE PLACED IN ONE OPERATION WITHOUT CONSTRUCTION JOINTS.



WALL SECTION THRU FRONT

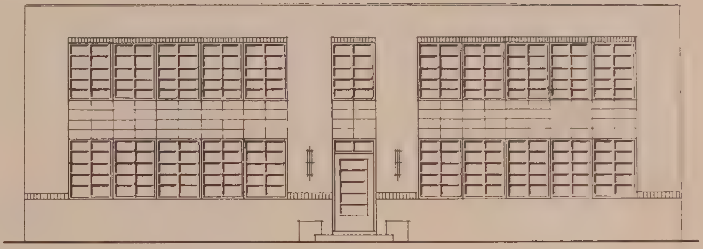


PERSPECTIVE OF ONE STORY BUILDING

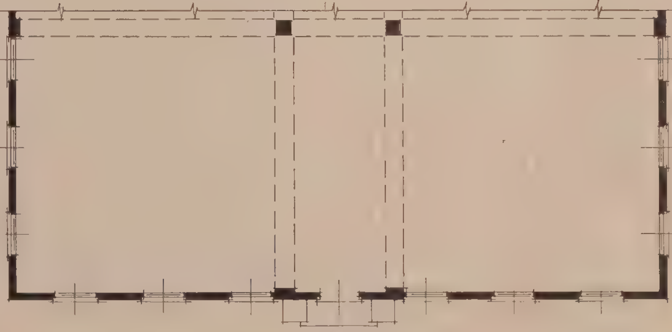

CONCRETE COPING SEE CONCRETE INFORMATION SHEET NO. AC-5
RAGGLE
COUNTER FLASHING
ROOFING
REINF. CONCRETE WALL
INSULATION
ORNAMENT ABOVE WINDOWS AND AT BELT COURSE SEE CONCRETE INFORMATION SHEET NO. AC-14
WINDOWS SEE CONCRETE INFORMATION SHEET NO. AC-6
FIRST FLOOR
GRADE
INE

NOTE - PERSPECTIVE OF ONE STORY BUILDING SHOWS ABOUT 40% LIGHT AREA. ELEVATION OF TWO STORY BUILDING 60%

WALL SECTION THRU FRONT



ELEVATION OF TWO STORY BUILDING



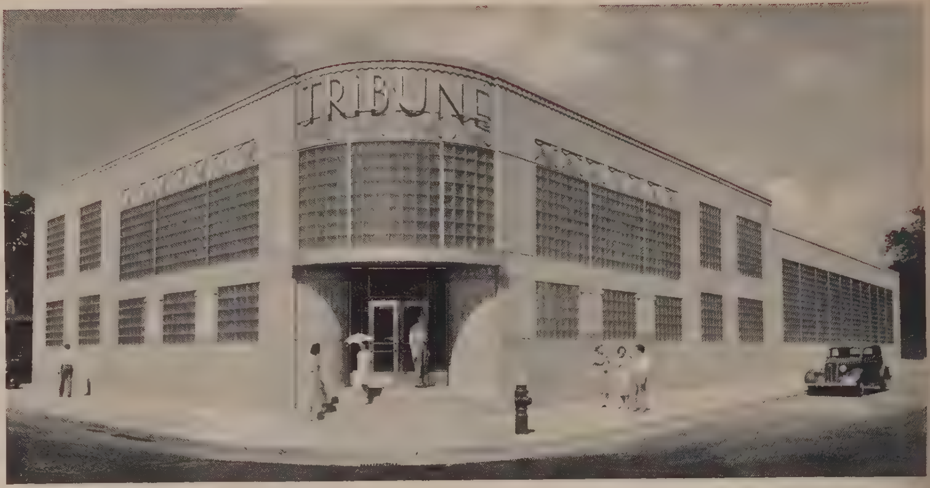
PLAN

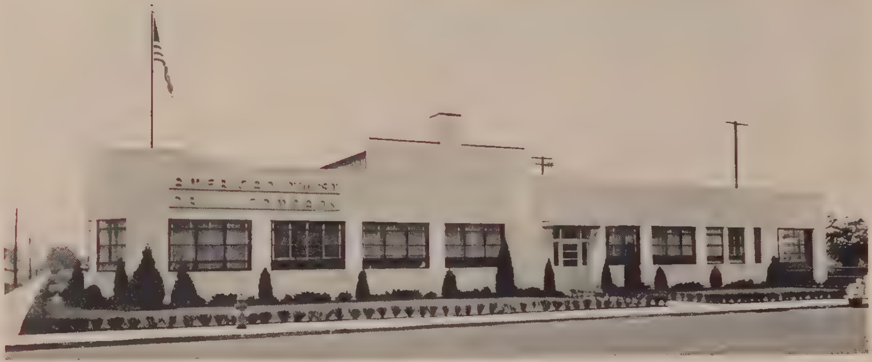
BETWEEN THE EXTREMES OF THE WINDOW-LESS AND THE DAYLIGHT TYPES OF INDUSTRIAL BUILDINGS THERE ARE THOSE IN WHICH WINDOWS ALTERNATE WITH AREAS OF SOLID WALL. FOR MOST MANUFACTURING PROCESSES A LARGE PART OF THE WALL AREA SHOULD BE WINDOWS, BUT FOR THE FACTORY OFFICE, WAREHOUSES AND CERTAIN OTHER OCCUPANCIES NOT REQUIRING PRECISION WORK ABOUT 40% LIGHT AREA WILL BE SUFFICIENT. TWO WAY SLAB FLOOR CONSTRUCTION WITH A NARROW CENTER AISLE SPAN PROVIDES A MAXIMUM OF UNOBSTRUCTED WORKING SPACE NEAR THE WINDOWS. BY BUILDING THE ROOF LEVEL AND DESIGNING IT FOR THE SAME LOAD AS THE FLOORS, ADDITIONAL STORIES MAY BE BUILT AT MINIMUM COST WHEN NEEDED.

LA CROSSE TRIBUNE &
LEADER PRESS
LA CROSSE, WISCONSIN

KRUSE AND PARISH
ARCHITECTS
DAVENPORT, IOWA

BOYUM, SCHUBERT &
SORENSEN
ASSOC. ARCHITECTS
LA CROSSE, WISCONSIN



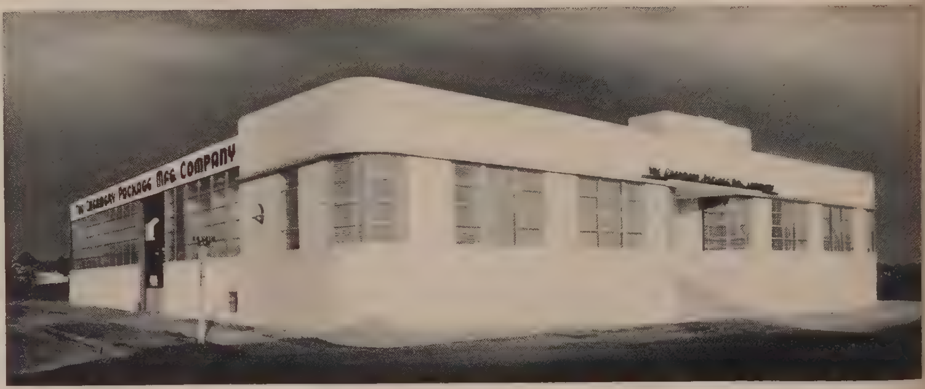


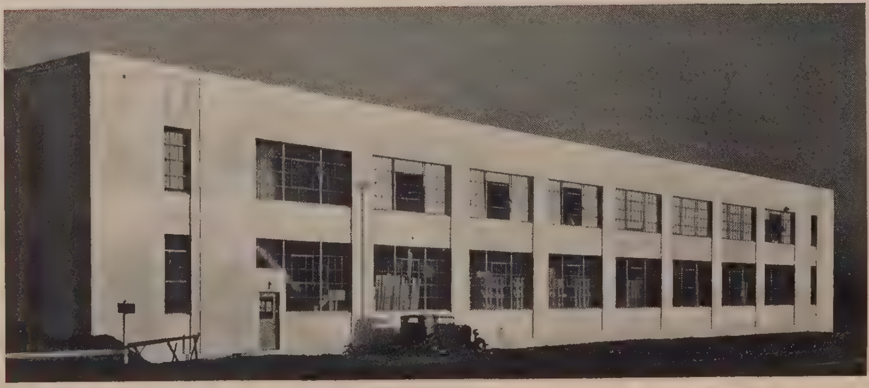
AMERICAN TWIST DRILL CO.
DETROIT, MICHIGAN

CLAIR W. DITCHY
ARCHITECT
DETROIT, MICHIGAN

CREAMERY PACKAGE
MANUFACTURING CO.
LOS ANGELES, CALIF.

DESIGNED AND BUILT BY
AUSTIN CO.

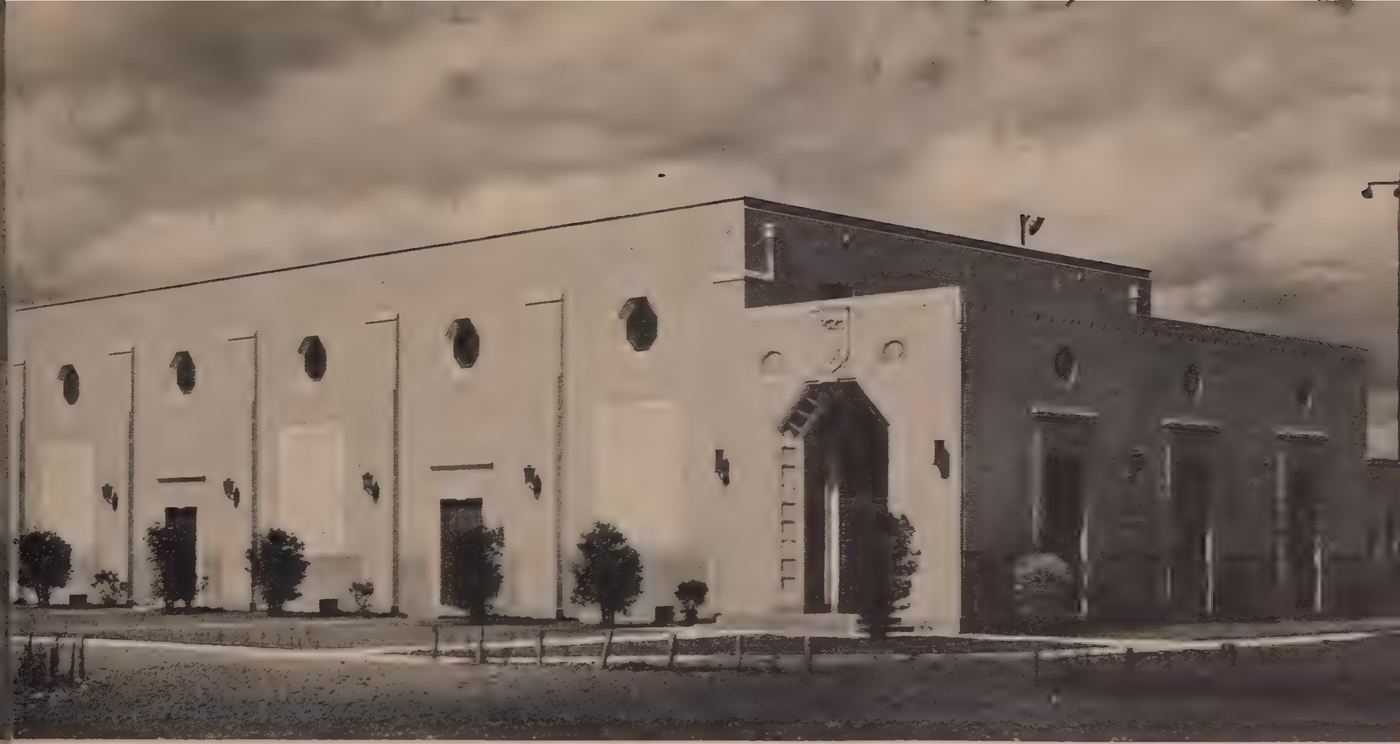




ARMSTRONG RUG CO.
EMERYVILLE
OAKLAND, CALIF.

WILL G. CORLETT
ARCHITECT
OAKLAND, CALIF.

Published by PORTLAND CEMENT ASSOCIATION • 33 WEST GRAND AVENUE • CHICAGO



Panels, plaques and friezes of molded concrete tell the romantic story of early Texas in the new Memorial Auditorium in Goliad State Park. S. C. P. Vosper and Raiford L. Stripling, associated architects of Goliad, were the designers. H. J. Von Rosenberg of San Antonio was the contractor.

A Shrine for Goliad

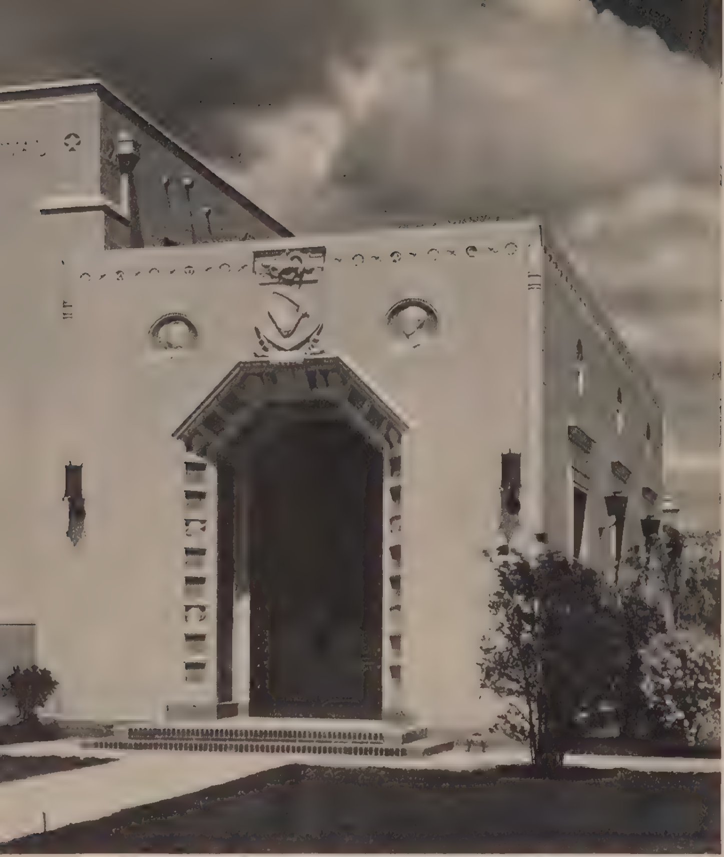
By S. C. P. Vosper, A.I.A.

TEXAS history, while comparatively brief as world history is conceived, is so complicated by a succession of influences, loyalties and conquests, that it would take much time for its proper telling. Because it is essentially a history of action in which violence played a frequent part, enough visible relics were left in its wake to tell a moving story once they are properly collected, reconstructed and preserved. This the state of Texas and the federal government have been systematically doing, and Goliad State Park, scene of several of the bitterest battles for Texan independence, where a memorial auditorium and museum has just been completed, is one of the shrines and depositories for vast stores of this romantic historical information.

The vicissitudes of Goliad include four different names for the town itself—Balmacea, followed by Santa Dorotea, then La Bahia, and finally Goliad. In addition to the pueblo or colony, it is the seat of a presidio or military post and two missions—Espiritu Santo, established by the Franciscan padres in 1749, and Mission Rosario, four miles upstream, founded a short while after. Goliad was where Texan independence was declared in 1835 and it was within the confines of the present Goliad Park that Colonel Fannin and 330 of his army, held prisoners in Presidio Nuestra Senora de Loreto in La Bahia by the Mexican army, were executed on Palm Sunday morning of 1836. Texan independence, won later that spring at the battle of San Jacinto, was followed by American colonization of the Goliad region, and the territory saw the start of the great cattle and livestock industry which brought a new type of romantic adventure to life in the southwest. In all, seven different flags have flown over Goliad, and each has left its own impression on this richly historical area.

The ruins left by time and many battles are now being reconstructed at Goliad. CCC workers, directed by the National Park Service, are rebuilding Mission Espiritu Santo, and when completed it will, with the Presidio chapel of La Bahia, present a typical Texas mission group. The Mission Espiritu Santo and the Presidio are about three-quarters of a mile from each other, and the same distance from the newly-built museum and auditorium. Their proximity and that of Rosario Mission was what impelled the architects to select a modified Texas Mission style for the memorial building.

Various phases in the development of the area are reflected in the details of the building. Three inscribed panels erected in the exterior walls describe important events in

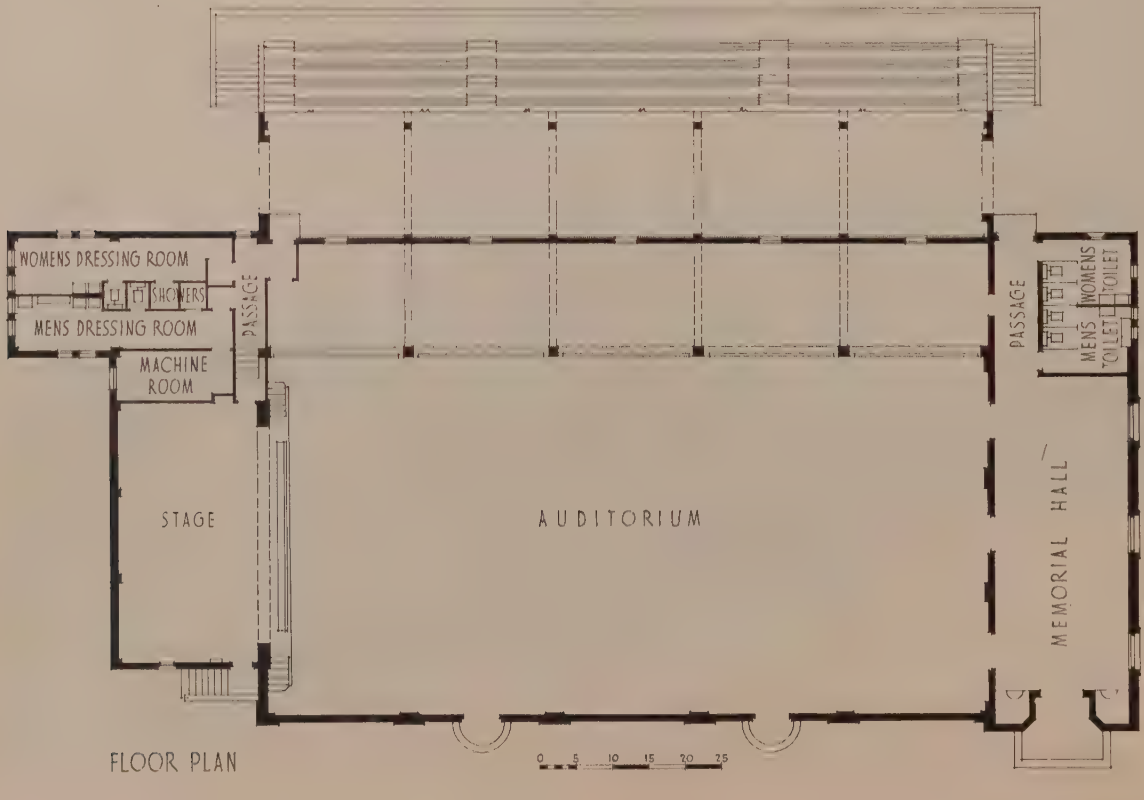


Form marks were emphasized to simulate Spanish masonry. Plaster waste molds inserted in the forms produced most of the detail, with cast stone used for the large inscriptive panels.

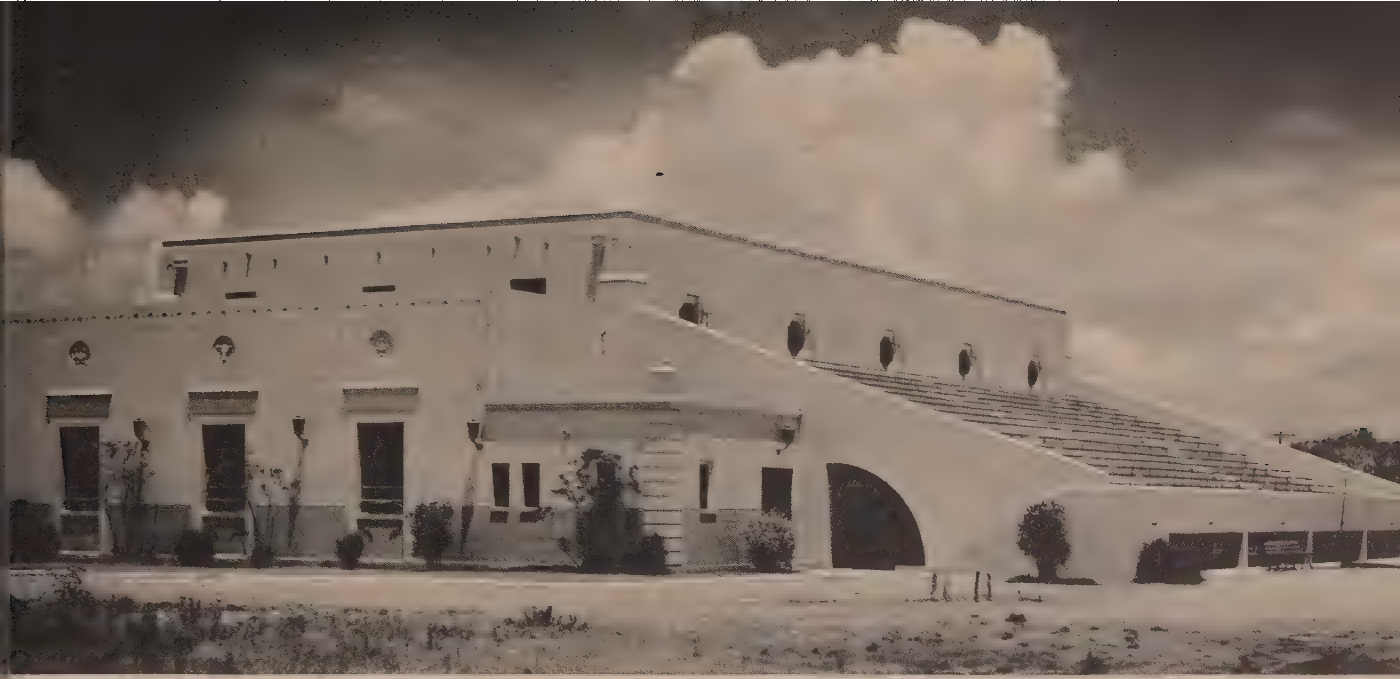
the religious, political, social and educational development of the region. Into the main entrance door jambs are molded representations of the races and people who at various times occupied the land. The shield of Goliad forms an interesting motif over the door and is flanked by plaques symbolizing the early American pioneer man and woman. Cattle brands of the early ranches form a decorative band on the parapet walls of the memorial hall and stage wings, while a similar band in the auditorium parapet reveals the names of famous Texas heroes who were identified with the history of Goliad. All these details are integral with the design of the building and are molded in the concrete which forms its walls.

The structure comprises three main elements: an auditorium with an ample stage; a memorial hall which also forms the lobby of the auditorium; and a stadium which runs along the east side of the building and is an integral part of it, projecting over the gallery of the auditorium.

A space 15 ft. wide and 100 ft. long at one side of the auditorium and under the highest part of the stadium provides for seating when the floor of the auditorium is used for dancing or indoor athletic events. Adjacent to the stage are showers and dressing rooms which are also accessible to the athletic field which fronts the stadium. The stadium, which seats 1,200, forms a shelter for exhibits of agricultural products and the space is also used as a club room. The playing field provides for football, baseball, softball



FLOOR PLAN



A stadium seating 1,200 is located on one side of the auditorium. Dressing rooms are located under the stands and serve both athletic events and theatrical productions held on the stage of the auditorium.

and track, and is adequately lighted for night use.

After preliminary sketches providing for architectural style and layout were completed, it became apparent that special care should be exercised in selecting the type of construction. Several months during the year excessive dampness is prevalent and tropical gulf storms are a menace to the entire coast of the Mexican Gulf. Provision had to be made to meet these conditions. In addition, the town is remote from trade centers, which meant a shortage of skilled labor and a re-handling cost in material shipments, and suggested use of local materials and local unskilled labor. Excellent sand and gravel were available nearby. After several types of construction were investigated it was decided that architectural concrete would be the most economical.

An architectural style was adopted to conform and harmonize with the Mission restoration that is typical Spanish masonry. A characteristic of the wall texture of Spanish masonry is that the courses were laid up with more or less continuous horizontal joints plainly visible. This suggested use of 1x6 square-edged form lumber to produce a rather pronounced board-marked texture, which proved satisfactory both from the standpoint of economy and texture effect.

Existing examples of old Spanish buildings are cool in summer and easily heated in winter. All have small openings which has led to the relatively small proportion of openings to solid walls in Mission architecture. Fenestration in Goliad Memorial was designed with this principle in mind, yet the high, small windows provide ample light.

The walls of the structure are ribbed reinforced concrete with a 3-in. shell thickness. Ribs are 24 in. on center, and project 6 in. inside the wall, giving an over-all wall thickness of 9 in. The ribs are 3 in. wide on the face and 4 in. where they join the wall. The ribbed wall was formed with wooden pans which were 9 ft. long. The pans were cleaned and reused as many as 12 times.

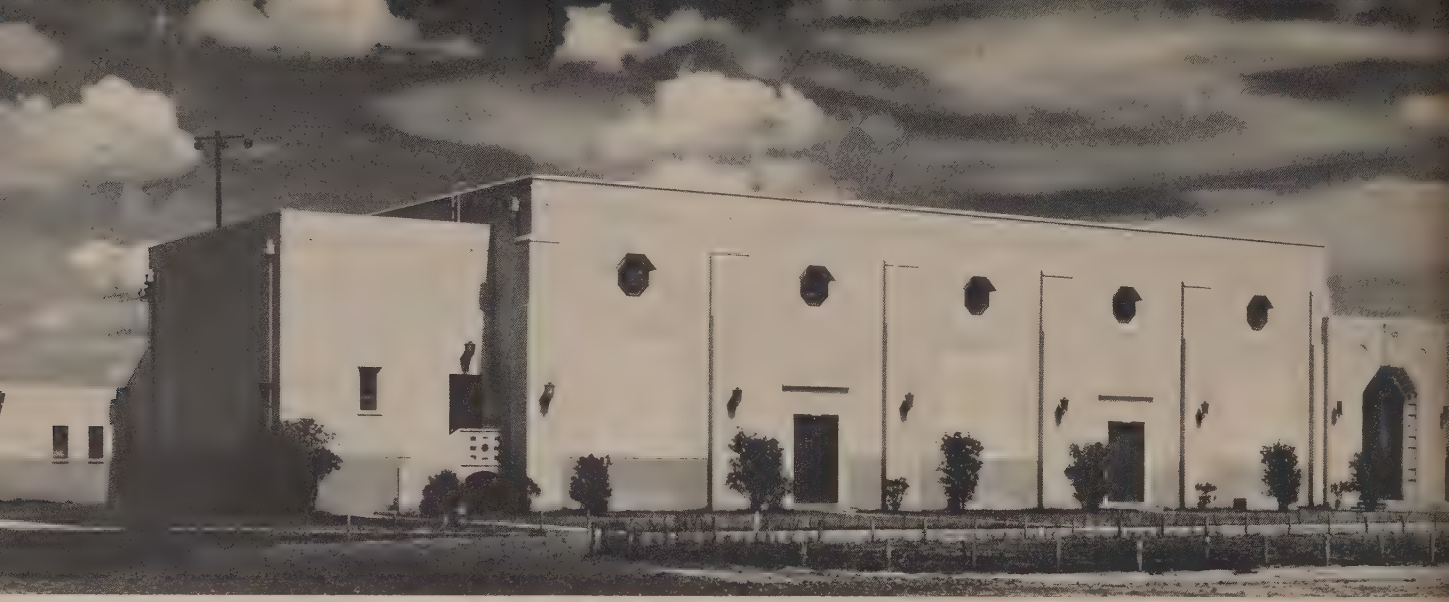
Some difficulty was experienced at the start from leakage between the square-edged boards used for the outside form. The trouble was readily overcome by pointing the cracks between boards with clay just before placing the concrete. Exterior form sheathing was reused several times.

Quarter-inch plywood was used on the exterior to form the trim around doors, windows and quoins on the southeast corner. A collapsible sheet metal form was used to mold the three-quarter circular corner motif, with a plaster mold forming the cap. Wood forms were used for moldings.

Snap ties were used throughout, arranged so the inside portion of the ties would remain for attaching furring.

Plaster molds were used for the sculptures at the main entrance, for the cattle brand motif around the north and south wings, and for the V-incised letters at the top of the auditorium wall. Inscriptive panels, color spandrels under the windows on the south, and the finial on the south elevation are cast stone. All plaster molds were tacked to the inside of the wood forms and holes were left in the back of the forms to permit careful working of concrete around the ornamental molds. Waste molds for the entire job cost about $750.

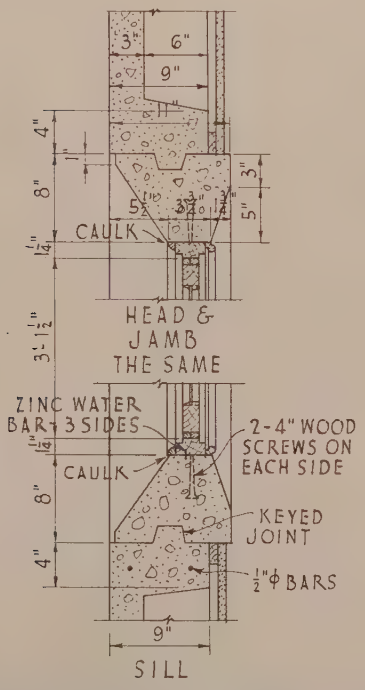
Typical walls were reinforced with ⅜-in. round bars 12 in. on centers both ways, with a ½-in. round in the back of each rib. The 4-in. rib around all openings was reinforced with two ½-in. round bars on each side extending

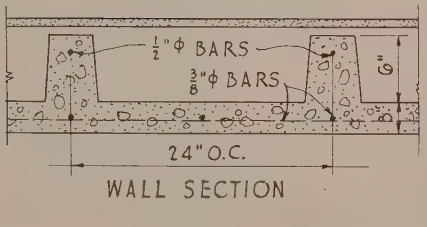


A general view of the memorial structure impresses the observer with the success of design which combines traditional and modern forms in concrete.

2 ft. past openings. The top of all parapets contains two continuous ¾-in. rounds lapped 2 ft. at the splices.

Concrete in the walls was made with 7 gal. of water for each sack of cement and the mix was approximately 1:2½:4 with 1½-in. maximum size aggregate. Concrete was hoisted to a hopper on a platform supported on the steel roof framing. From there it was conveyed by buggies.





Any blemishes were pointed immediately after the forms were stripped, and the walls were lightly rubbed with carborundum stones twice, without obliterating form marks. The entire structure, with exception of cast stone work, received two coats of flat tung oil paint, the base course neutral grey and upper portion oyster-shell white.

Inside walls, furred out with plaster, will be decorated with murals and painted symbolic ornaments of historic interest in a manner suggested by painted decorations in existing Texas missions. The proscenium arch is decorated with modeled and painted shields of the various nations which have occupied the area. The center shield, that of Goliad, has agricultural products of the region on either side and is surmounted by the Texas longhorn, suggestive of the early trail driver. Various native flowers, animals and cattle brands, considered the heraldry of Texas, will form the theme of the decorative scheme.

Funds were provided by a joint federal and state appropriation for the Texas Centennial celebration. A sum of $70,000 was allotted to finance construction: $55,402 for the general contract, $6,257 for mechanical work and the remainder for decoration, furnishing and architects' fees.

Work was started March 1937, but was delayed by unseasonable rain. It was finished in December.

The structure was designed by the writer and Raiford L. Stripling, associated architects of Goliad and Willard E. Simpson, of San Antonio, consulting engineer. Hugo Villa, sculptor, modeled the main entrance sculptures. H. J. Von Rosenberg, of San Antonio, was general contractor. The local Centennial Committee was headed by J. A. White, county judge of Goliad County.

Orthopedic School—Los Angeles

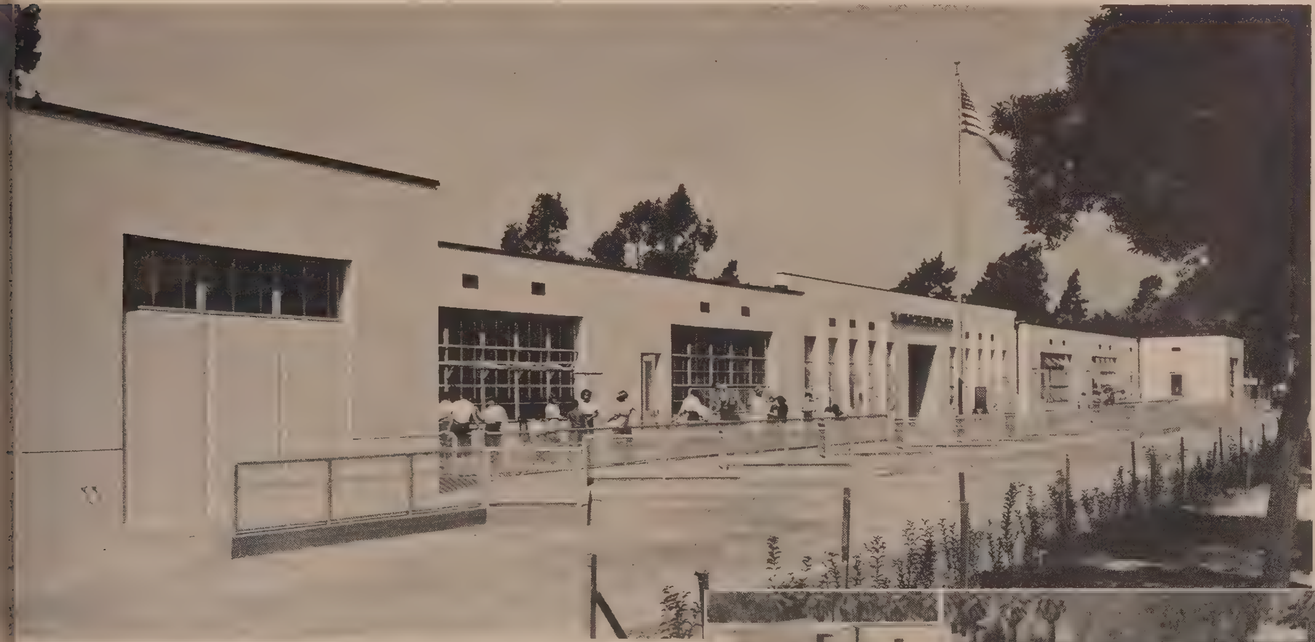
By W. F. Ruck, Architect

PLANNING and designing a school that is not only an educational institution but a health center as well, presents many unusual and interesting problems. The recently-completed Washington Boulevard Orthopedic School for crippled children in Los Angeles illustrates the manner in which some of these special problems were solved.

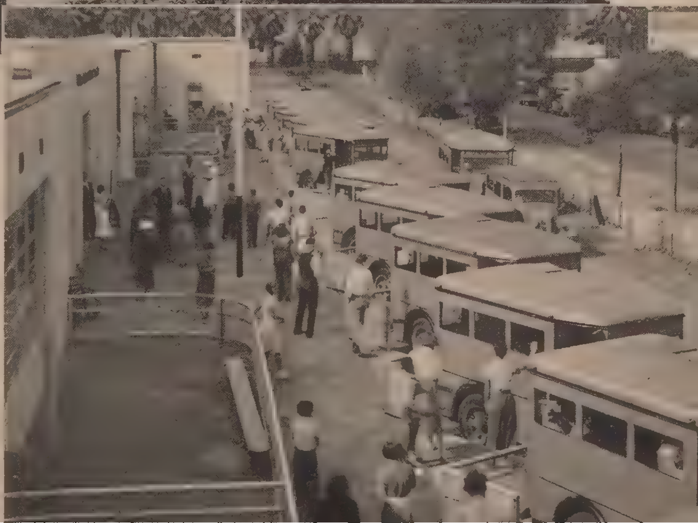
An important aim, never lost sight of during the planning, was to keep the building as bright and cheerful and as little like an institution as possible. It is recognized that one of the greatest aids in correction of physical difficulties is to preserve a normal, healthful attitude. In appearance, therefore, Washington Boulevard School is much like other new schools in Los Angeles.

Where it differs is in layout and in the planning of various facilities for comfort, convenience and safety of crippled children. All the rooms are on one floor. There are no stairs, all necessary changes in elevation being by ramp. Throughout the interior of the building non-slip floors are provided. There are 10 class rooms and 2 physiotherapy class rooms—each with an outdoor sun terrace. In addition there are 2 children's rest rooms accommodating 36 cots each, with directly accessible sun baths. Even the auditorium is designed to serve also for corrective physical education.

The normal capacity of the building is 300 students, most of whom are brought to school in buses. Probably



Plenty of light and air and maximum safety features are incorporated in Washington Boulevard School for crippled children in Los Angeles. Designed by W. F. Ruck, architect, and Zara Witkin, engineer. The contractor was Harvey A. Nichols.



An interesting feature of the layout is the saw-tooth shaped platform for unloading crippled children from buses.

the only indication from the exterior that Washington Boulevard School serves a special purpose is the loading platforms which enable children to step out of the buses without difficulty. This platform is a saw-tooth arrangement by which a large number of buses can park at an angle with their side doors adjacent to the platform. Fences protect the children from falling off the platforms should they slip or falter in wet weather.

The school is entirely reinforced concrete to insure the maximum of fire and earthquake safety. Exterior walls are formed against wide horizontal boards and finished with white cement paint. Eight slender pilasters grouped in the wall of the main section of the building, together with balanced fenestration, give architectural interest to a facade that might, due to its necessarily great length and low height, prove monotonous.

The auditorium, in which walls and ceiling beams are exposed concrete, is used also for therapeutic exercises.

Dr. Chas. Le Roy Lowman of the Los Angeles Orthopedic Hospital consulted with the architect during the planning of the building. Structural engineer for the work was S. B. Barnes and the contractor, Harvey A. Nichols.

• •

School for Disabled—Cleveland

By A. C. Robinson*

THE Association for Crippled and Disabled at Cleveland, Ohio, was established in 1889 and incorporated in 1902 with three avowed purposes: to assure all crippled and disabled persons in the city and its vicinity the best physical condition they can possibly attain; to provide them with the most useful education; and to aid them in getting the most suitable employment they are competent to undertake.

---

*Garfield, Harris, Robinson & Schafer, Architects.

Need for increased facilities to carry on their fine work prompted the Association for Crippled and Disabled, Cleveland, to erect a new building this past year. Garfield, Harris, Robinson & Schafer were the architects.

Functioning as a clinic, school and employment
the Association has been handicapped during mos
existence by inadequate quarters until, early in 1
was decided to build a new structure adjacent to t
building at 2233 East 55th Street. This new buildi
modern, factory-type structure, depending upon lin
the proportion of glass to wall surface for its archite
character. The style was chosen because it best exp
the functional uses of the building; for it contains carp
painting and wood-working shops, sewing and dressm

Lightweight concrete masonry was used as back-up for the rein
concrete walls. The masonry was left exposed after painting

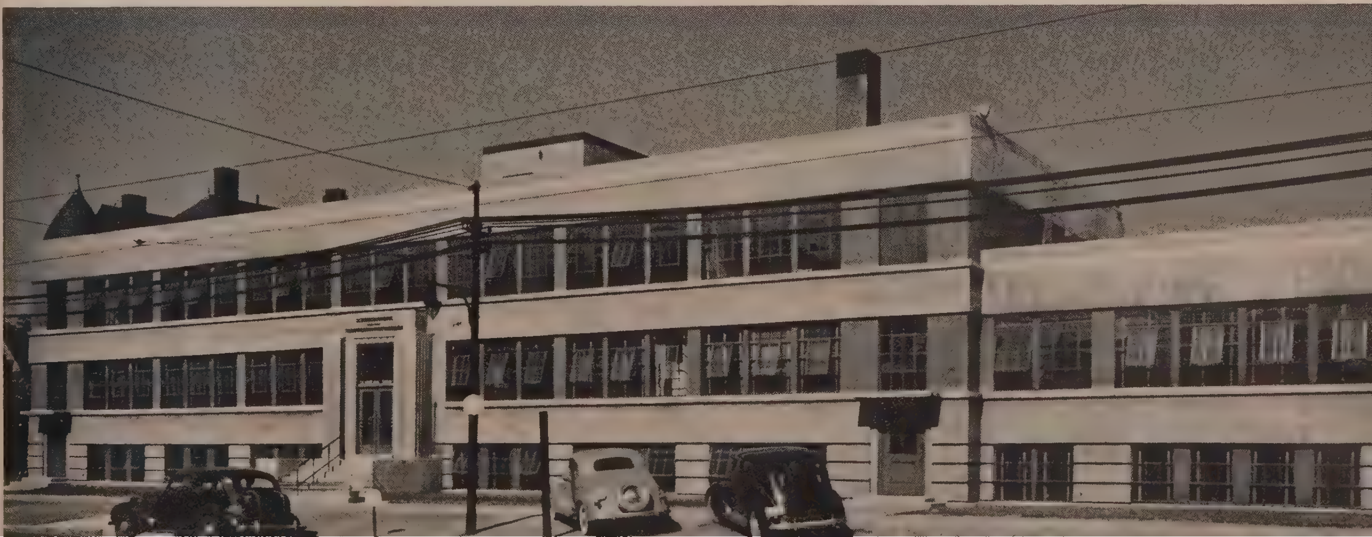
and because it was
medium for expressing the design of the building.

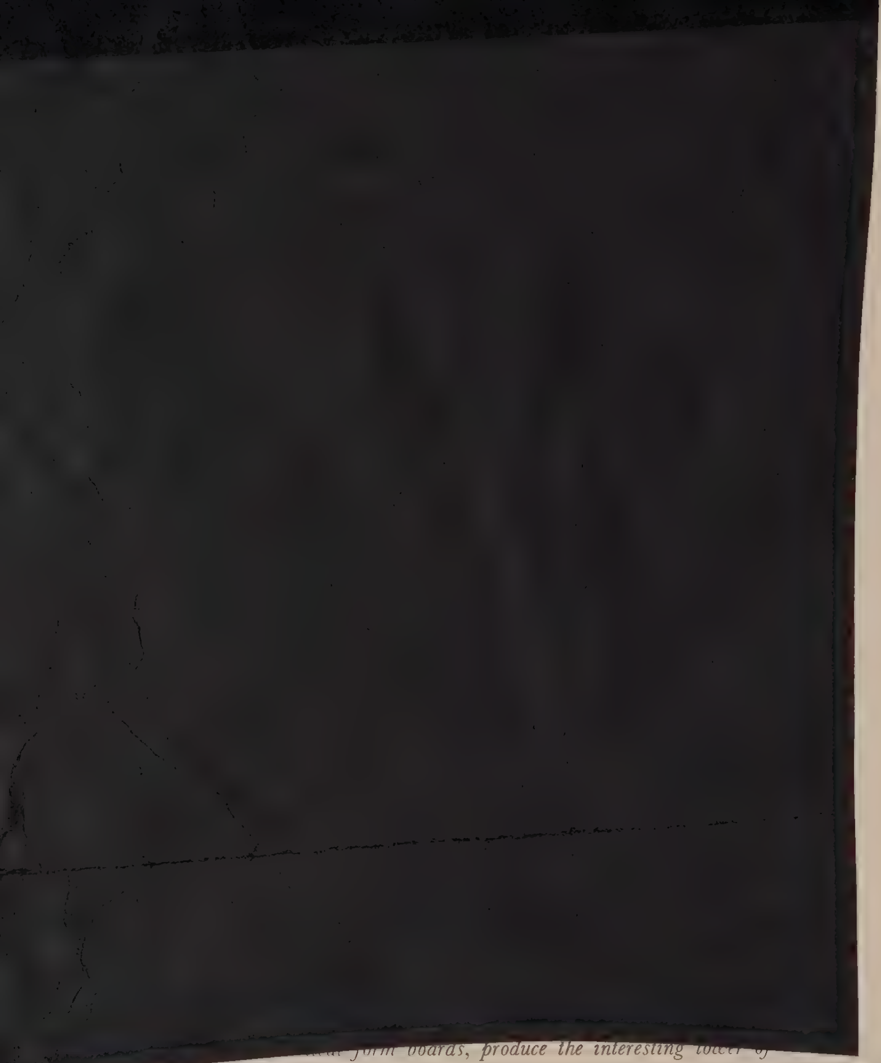
Forms were lined with ¼-in. plywood. No plaster molds were used, wood strips being inserted in the forms to produce rustications and flutes in entrance pilasters.

Truck-mixed concrete, designed for a minimum of 2,500 p.s.i. at 28 days, was brought to the job and hoisted with a tower to each level. Buggies were used to distribute the concrete to the forms.

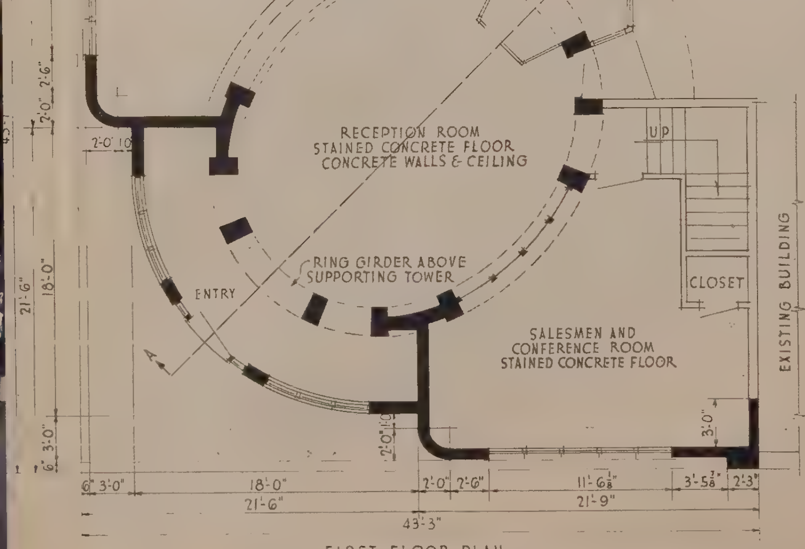
All exposed surfaces were painted with cement paint after the concrete had been cleaned and lightly rubbed.

Characterizing the work that goes on within, the building has the appearance of a modern industrial structure.





form boards, produce the interesting tower of n-Bevis Company Building, Los Angeles. W. F. Ruck, architect; DeCamp-Hudson Company, Ltd.. contractor; Zara Witkin, supervisor of construction.



FIRST FLOOR PLAN

Novel Design Becomes Trademark

By Zara Witkin, Civil Engineer*

BROWN-Bevis Equipment Company of Los Angeles, handler of construction machinery of all types, has recently occupied a new administration building of such unique design that its architecture has become the firm's trademark, and the shape of the building is now being used as a symbol on stationery, advertising and as a stamp to identify equipment leaving the plant.

Comprising a set-back elliptical tower and two 2-story wings, it is set into the corner of an existing single-story brick structure which, until now, has housed the offices as well as the operating and work divisions of the company. The new building contains executive, clerical, sales, engineering and accounting departments.

Although it is not large, the Brown-Bevis building presented several interesting structural features.

The tower, elliptical in shape, is designed to support a future roof sign. Legs of the structural steel frame which will carry the sign are supported on an elliptical ring which takes both horizontal and vertical thrusts. In resisting the outward thrust, the ring beam develops combined bending and direct ring tension stresses.

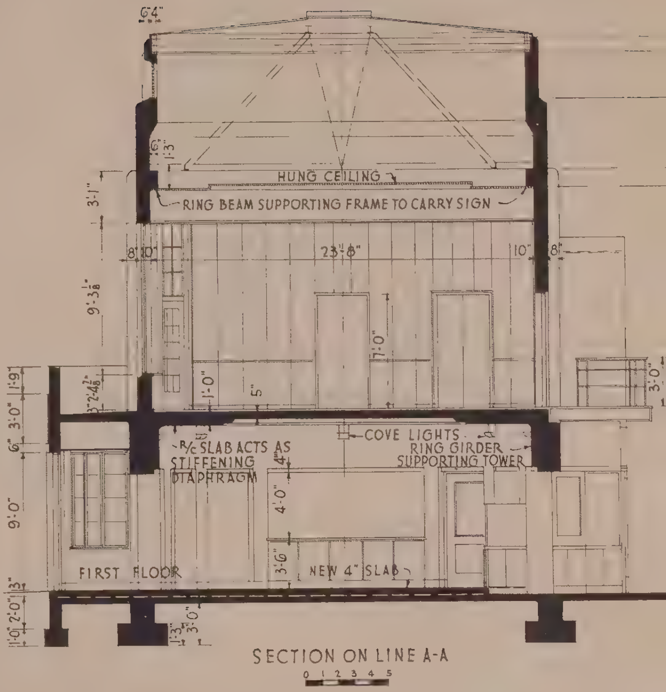
---

*In charge of construction.

The reinforced concrete second floor was designed as a 2-way slab supported along its oval-shaped perimeter by the tower wall and functions as a diaphragm to resist lateral forces.

In the first story the tower is supported on a series of concrete columns which follow the elliptical perimeter. These columns rest on a continuous elliptical foundation. In the structural design, the tower was treated as a cylinder on end stiffened with diaphragms for resistance to earthquake forces. Because of the elliptical shape and the fact that the first-story supports consist of a series of closely-spaced columns on the ellipse perimeter instead of a solid shell, some very complicated stresses were produced when both vertical and lateral forces were considered. However, since the architectural design called for comparatively heavy piers, it was found that approximations on the safe side could be made without appreciable additional cost.

Use of reinforced concrete on this project permitted a design which, from both architectural and structural standpoints, would be difficult to execute in any other material. Its integral character makes it possible in the future to reconstruct other portions of the old plant and carry the lateral stresses into this new section which will brace the whole.

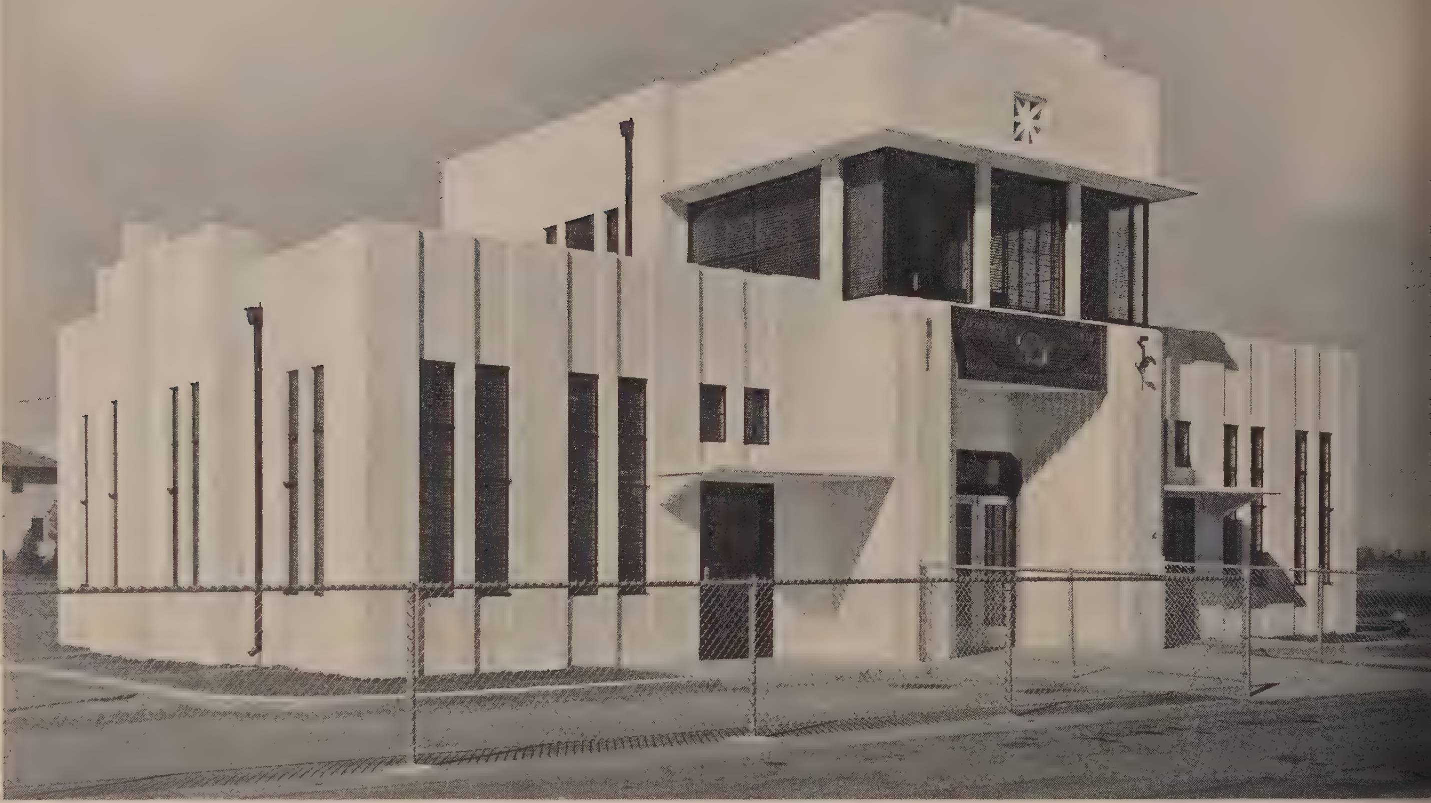


SECTION ON LINE A-A

Architecturally, the building depends more on arrangement of masses than on surface detail for effect. The round corners of the wings harmonize with the sweeping curve of the corner tower motif. The texture is distinguished by running the narrow form boards vertically instead of horizontally, giving the walls an interesting vertical marking under its finish of cement paint.

The building was designed by W. F. Ruck, architect of Los Angeles. S. B. Barnes was structural engineer and DeCamp-Hudson Company, Ltd. was the contractor.

Smooth-formed concrete is exposed on the interior. Here the lobby takes the novel shape of the tower and gives access to all departments of the plant.



Grand Island, Nebraska, famed "mid-point" of Pony Express days, has just built an airport to make it a better mid-point for coast-to-coast airplanes. K. H. Gedney Company, architect. The construction was by WPA.

The "Mid-Point" Goes to Town

By Luke Hahn*

THAT century-old artery of cross-country traffic, route of the covered wagon, Pony Express, the first continental railroad and the first coast-to-coast airline, is again making history.

United Air Lines, oldest coast-to-coast airway, is carrying on the time-honored tradition of pioneering with a record of having flown more passenger miles, more express, and more mail than any other airline in the world. Where 25 years ago it required 50 days to cross the country—today, United's "mainliners" make the same journey in 15 hours.

Being a part of, and sharing in this historical march of progress, the "mid-continent point" along this famous old highway, Grand Island, Nebraska, considered it fitting and proper that it keep step with changing times and prepare itself to continue its share of responsibility by building a new airport to meet modern and future requirements.

Grand Island's Municipal Airport, dedicated last September 28 as Arrasmith Field, meets those requirements. It possesses these outstanding advantages: a full section of 640 acres, an unusually large available paved and turfed runway area, completely modern hangar and administration building, its own radio and beam station, latest field lights and—what is most unusual—freedom from power or tele-

---

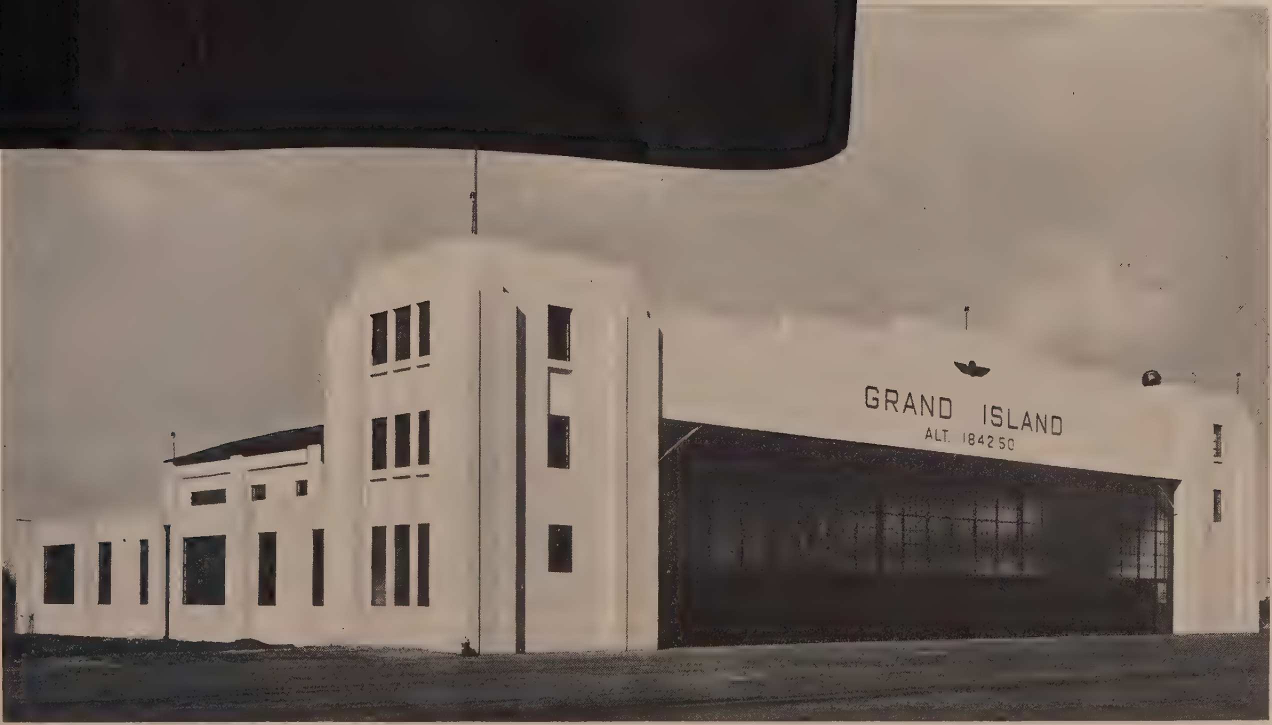
*WPA Construction Superintendent.

ize standard panels—4x12 ft.—and reduce
he number of irregular panels. Vertical
with corrugated metal forms, and the
s were built in auxiliary panels which
he standard forming.

reused about 6 times on the administra-
, due to the design of the hangar, as
of some material were recorded.

f the administration building and both
gar were insulated with ¾ in. of mica
itions and the ceilings of the administra-
¼ in. of the same insulation. A mix of
60 lb. of portland cement was used to
which was selected because of its high
d to save furring and lathing. The insu-
with a thin white coat followed by two
paint and was decorated with oil paints.
sulation was also used on all concrete
dministration building and on flat con-
angar.

s, radio room and traffic lobby, which
4-in. linoleum, the first and second-story
nistration building were surfaced with
finish of the structure was two coats of
nt with a small use of black oil paint
loors.



Airport buildings include an administration building (see facing page) and a hangar (above). Both are reinforced concrete buildings, smooth-formed and finished with white cement paint.

Modern, efficient and safe were the requirements set up for Port Allen High School, West Baton Rouge, Louisiana. Concrete was chosen to provide these necessities. Bodman and Murrell were the architects and Caldwell Bros. & Hart, the contractors.

Port Allen High School

By Richard C. Murrell*

"IF YOU desire instruction, you will be well instructed," is the inscription cast in concrete over the entrance of the new Port Allen High School; and this ideal guided the efforts of the school board of West Baton Rouge, Louisiana, as they planned for a building that should inspire in students a desire to study, and give them a sense of pride in being enrolled in an institution housed in a building that is well designed and proportioned and strongly constructed.

A first requirement was that it be modern in form and function, affording easy communication from one department to another. It was equally essential that modern materials should be used to express the design and purpose of the building. When the architects were called in, it became their task to mold and crystallize these ideas into working drawings and details and to suggest how best they could be accomplished in construction. It was evident, after some study of the problem, that architectural concrete should be the medium of construction—not only for economic reasons, but for its adaptability to modern forms of design which is resulting in the steadily growing popularity of this type of construction even though comparatively new in many localities. Many architects are rapidly coming to the conclusion that architectural concrete will be the generally accepted form of construction for schools and other public buildings of the future.

Following a conservative-modern style, the building's dominant feature is a 58-ft. tower rising above the main entrance to the school at the central axis. Pilasters with vertical grooving are located at the four corners of the tower, and are set back near the top against beveled surfaces producing a soft contrast of planes and surfaces. At the right end of the main structure is the combination auditorium and gymnasium, which is complete with stage, dressing rooms, athletic director's office, locker and shower facilities.

---

*Bodman and Murrell, Architects.

Although it is a one-story structure except for the portion out of which the tower rises, the 320-ft. length of the building expresses a feeling of spacious dignity, and its light cream color and slate-blue steel windows give the whole a most cheerful feeling.

There is no waste space in the plan. On the first floor are eight general class rooms, a commercial department with typing room adjacent, library and librarian's office and work room, administration offices, rest rooms and storage vaults. The second floor houses a general science laboratory, chemistry laboratory, instructor's office and stock room. Although the building is designed to provide facilities for a future enrollment of 400 students, the plan is so arranged that the building can be easily enlarged and expanded.

Exterior walls were cast in plywood forms with horizontal and vertical strips inserted in the form faces to produce simple surface detail. At various points in the facade, ornamental panels dealing with conventional motifs typical of Louisiana plant and wild life were inserted. These plaques were precast in plaster molds and inserted in the wall forms so that the detail would become an integral part of the wall.

Convenient levels for stopping each lift of concrete were predetermined so that the construction joints would not show perceptibly in the finished wall. The smooth finish of the exterior concrete was accomplished by light hand rubbing with carborundum stones.

Because of the length of the building and the difference in mass of the various portions, it was considered necessary to provide expansion joints at each side of the two-story section and at the juncture of the main building and the auditorium.

Floor slabs were placed on earth fill at an elevation about 2 ft. above natural grade line. Pressure-creosoted wood sleepers were embedded in the concrete and a single wood floor was installed where such finish was desired. A membrane waterproofing was used between the slab and the wood flooring.

The simplest and most economical interior treatment was employed. Throughout most of the interior, natural plaster walls, cement plaster wainscoting, light-colored Celotex ceilings and oak slab doors with dull nickel hardware were used, producing a tastefully pleasing effect. The entrance vestibule and lobby was somewhat enriched by the use of marble wainscoting and aluminum doors and trim.

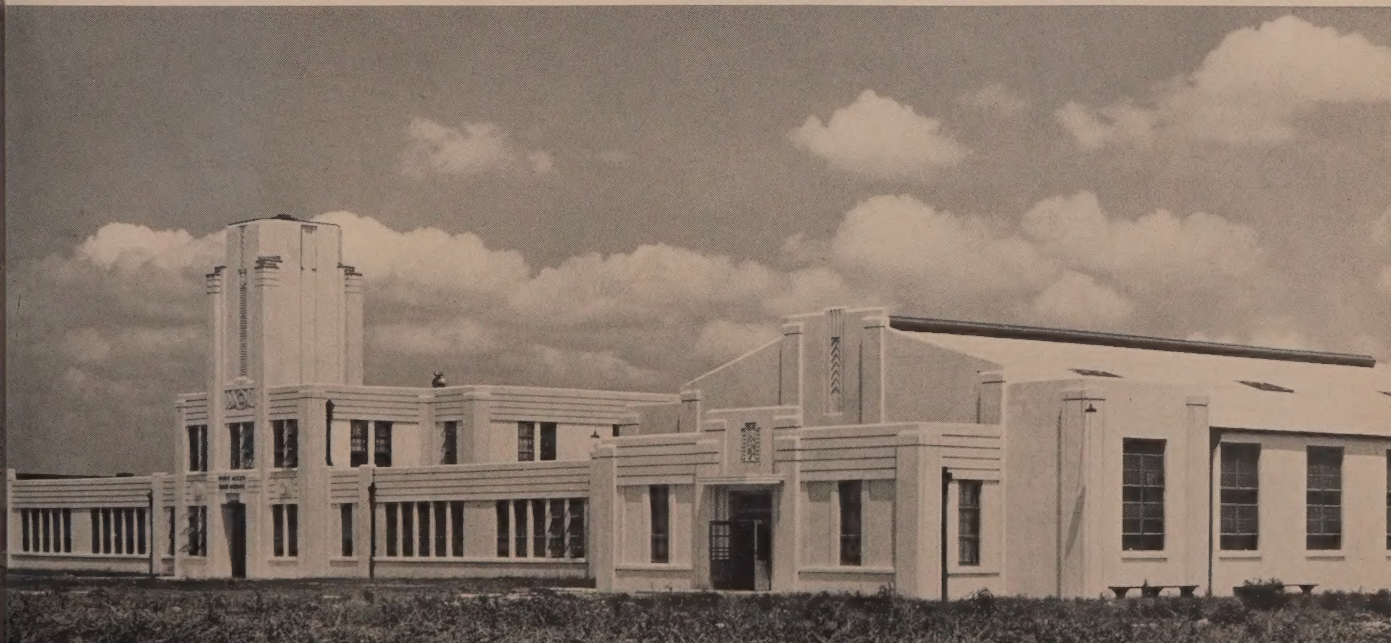
Equipment for class rooms and work rooms is of the most modern design. Indirect illumination is used in most rooms except the auditorium where cove lighting is employed. Provision is made for installation of a public address system whenever it is desired.

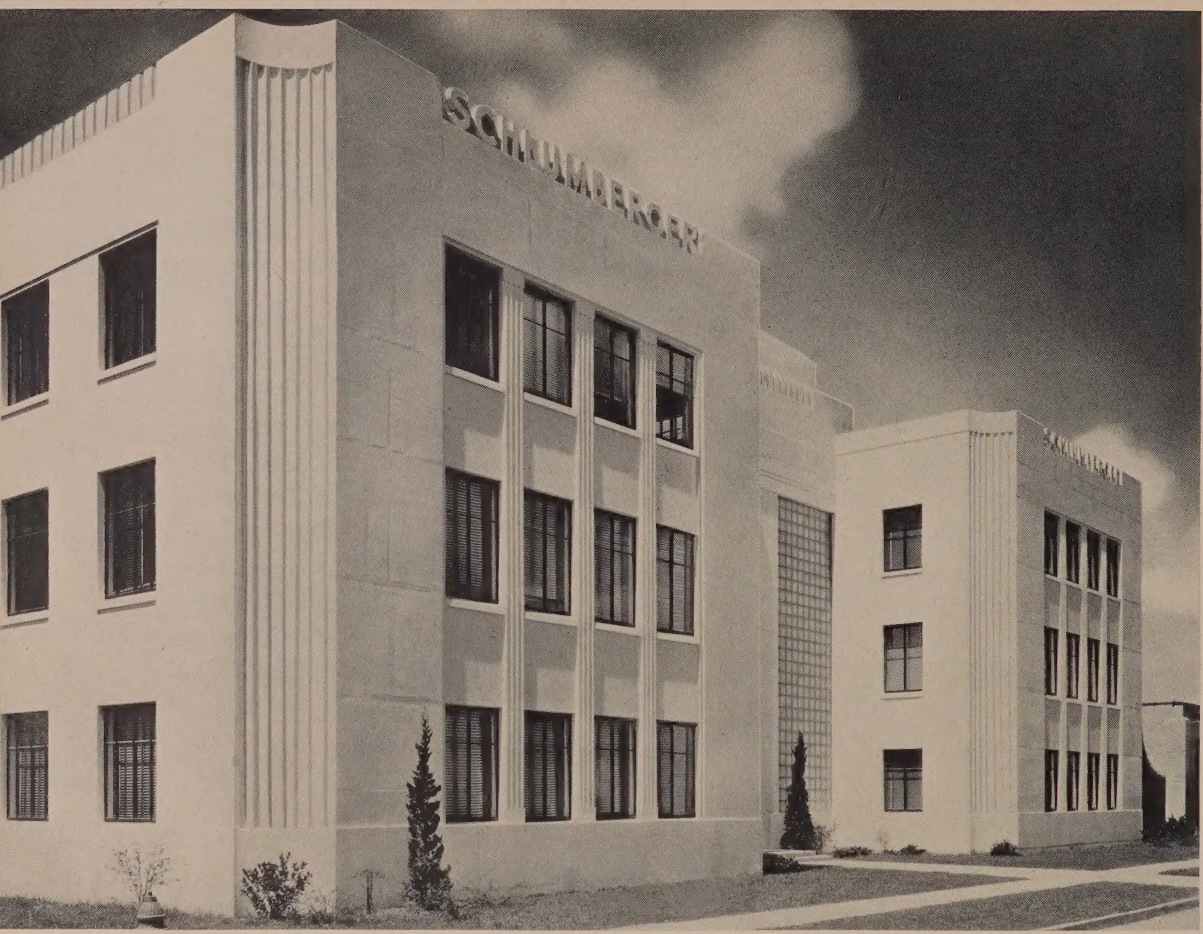
Central heating is provided by an oil-burning two-pipe gravity steam system with boiler room in the central area. The stack is concealed in the tower above. For the sake of economy and easy access in case repairs are necessary, all supply lines have been exposed except in the entrance lobby.

Generous concrete paving provides adequate circulation for pedestrian and motor traffic in the vicinity of the building. A rainy day entrance is located at the west end of the building where school buses can be unloaded under protection of a concrete canopy.

The building was completed in record time at a cost of about $170,000 including equipment. The work was done to the complete satisfaction of all concerned by Caldwell Bros. & Hart, contractors.

The building includes class rooms and a combination auditorium and gymnasium. Most of these facilities are at ground level. A tower dominates the main facade, but strong horizontal feeling is given the whole structure by the use of rustication lines.





New Home for the "Slumberjay"

Schlumberger Well Surveying Corporation symbolized its new, modern business by erecting a modern office building in architectural concrete. The Russell Brown Company was the architect, Walter P. Moore, consulting engineer, and Hubbard Construction Company, the contractor—all of Houston.

By W. Addison McElroy*

IN times past a great deal of the exploration for mineral wealth under the earth's crust was preceded by the mystic antics of men who waved forked peach branch "divining rods" over the ground. The idea was that, when the sticks twitched or pointed, it indicated oil, water, salt, gold—or anything they happened to be looking for—was directly underneath. If there were mineral deposits there, the venture was a marvelous success; but mostly it turned out to be costly hocus-pocus. These rod-wavers are called "dowsers," and although they still exist in large numbers—because superstition dies hard—their day is about done.

Rapidly replacing them are crews of men and machines which are making mineral exploration a science and are taking some of the hazards out of wildcatting.

Probably as mysterious to the layman as the divining rod is the instrument-laden well exploration truck which men in the oil fields call the "Slumberjay." The name of this truck derives from the Schlumberger (pronounced Shloom-bair-zhay) Well Surveying Corporation of Houston, Texas, which in the past five years has so thoroughly demonstrated the value of scientific well exploration by electrical means that it has developed a thriving business. Schlumberger has scores of these traveling laboratories working every day in dozens of different oil fields, and the business is still growing.

Because their business is new and modern, the Schlumberger Corporation felt definitely that its new office building, in appearance and plan, should reflect the youth and progressiveness of the organization. Consequently, a frankly modern design was selected, and the entire structure was executed from footings to roof in architectural concrete.

The building is H-shaped with over-all dimensions of 99x125 ft., comprising two wings with a connecting lobby at each floor level. Three stories in height, the structure is designed for two additional stories to be constructed later.

---

*Architect with The Russell Brown Company.

Probably the most interesting exterior architectural features are the curved fluted corners, fluted pilasters, the molded dentils and cast-in-place letters of the parapet. Architectural concrete was found readily adaptable to such details and although ornament was held in restraint, it was emphasized by contrast with plain wall surfaces.

A soil test made before the final structural design was prepared showed satisfactory clay 12 to 15 ft. below ground level, and some of the spot footings were located at the lower level in order to clear the basement floor. Exterior concrete walls between columns are 8 in. thick, except the front wall which is 9 in. thick to provide for the fluting. All outside walls are furred with 2-in. gypsum blocks and plastered.

In order to obtain a concrete of proper quality and density and one that would produce a good surface on the exterior of the building, a minimum cement factor of 5½ bags per cu. yd. was used, although this amount of cement gave strengths well in excess of those required by the structural design. The quantity of mixing water was carefully controlled at all times, adjustments being made for the moisture contained in the aggregate whenever necessary. Aggregates were proportioned by weight. Volume measurement of aggregates was not permitted. The average mix was about 1:2.9:3.5. This mix might seem a little high in sand since the fine aggregate was about 45 per cent of the total, but that amount was found necessary to give proper workability and prevent bleeding. Firm, sharp corners and arrises were produced and little or no patching was required for a satisfactory finish.

Concrete was delivered in transit mixers to a construction tower, elevated to proper level and dumped into a hopper. From there it was transported in buggies to forms. Vibration was used continuously during placement.

Smooth surfaces were cast against ¾-in. fir plywood which was oiled at the mill and cleaned and re-oiled after each use. The 4x6 plywood sheets were built into 6x12-ft. panels, since each lift of concrete was about 6 ft. high. Studs were placed on 12-in. centers. Forms for fluting at the corners and in the pilasters were made of white pine and assembled at the mill. Each fluting form was 12 ft. long and was used three times in the height of the building.

Plaster waste molds were used to cast dentils and letters in the parapet. Because this ornament was repeated, the waste molds did not require a large number of models. In fact, mold cost did not exceed $200 for the entire job. The first waste molds used were given only one coat of shellac, but since a great deal of effort and care was required to remove them satisfactorily, succeeding molds were given two coats, which made them much easier to remove.

The letters of the sign are 1 ft. 9 in. high, 2 in. at the bottom and 3½ in. deep at the top. Cream in color, they are emphasized by a background of azure blue paint corresponding with the color of the Formica entrance doors.

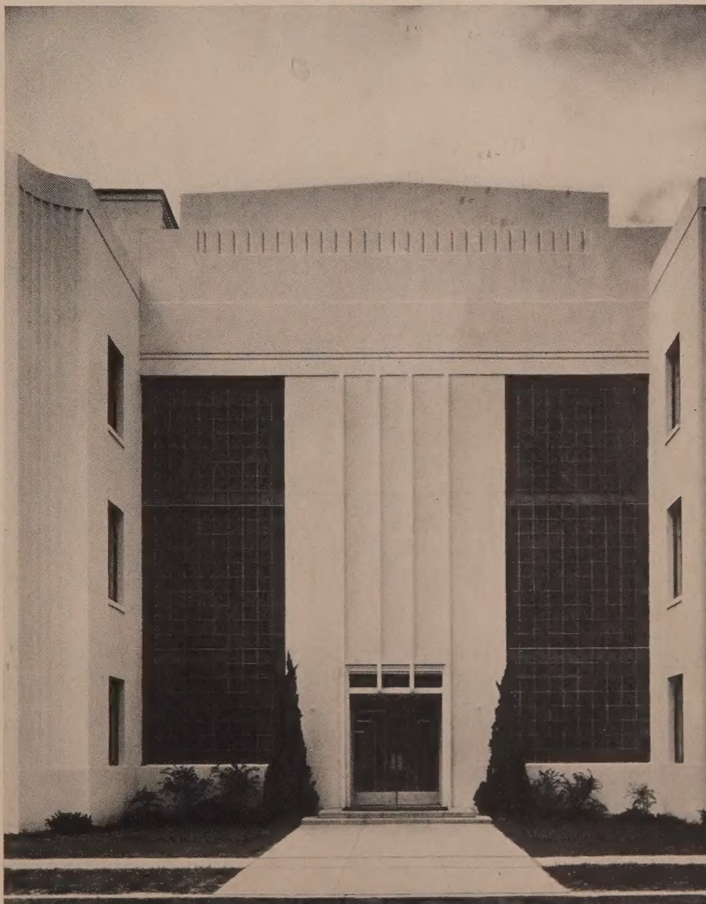
As the structure neared completion, the entire exterior was lightly rubbed with a power carborundum stone. The surfaces were then given two coats of cream-colored cement paint. Metal sash are painted black.

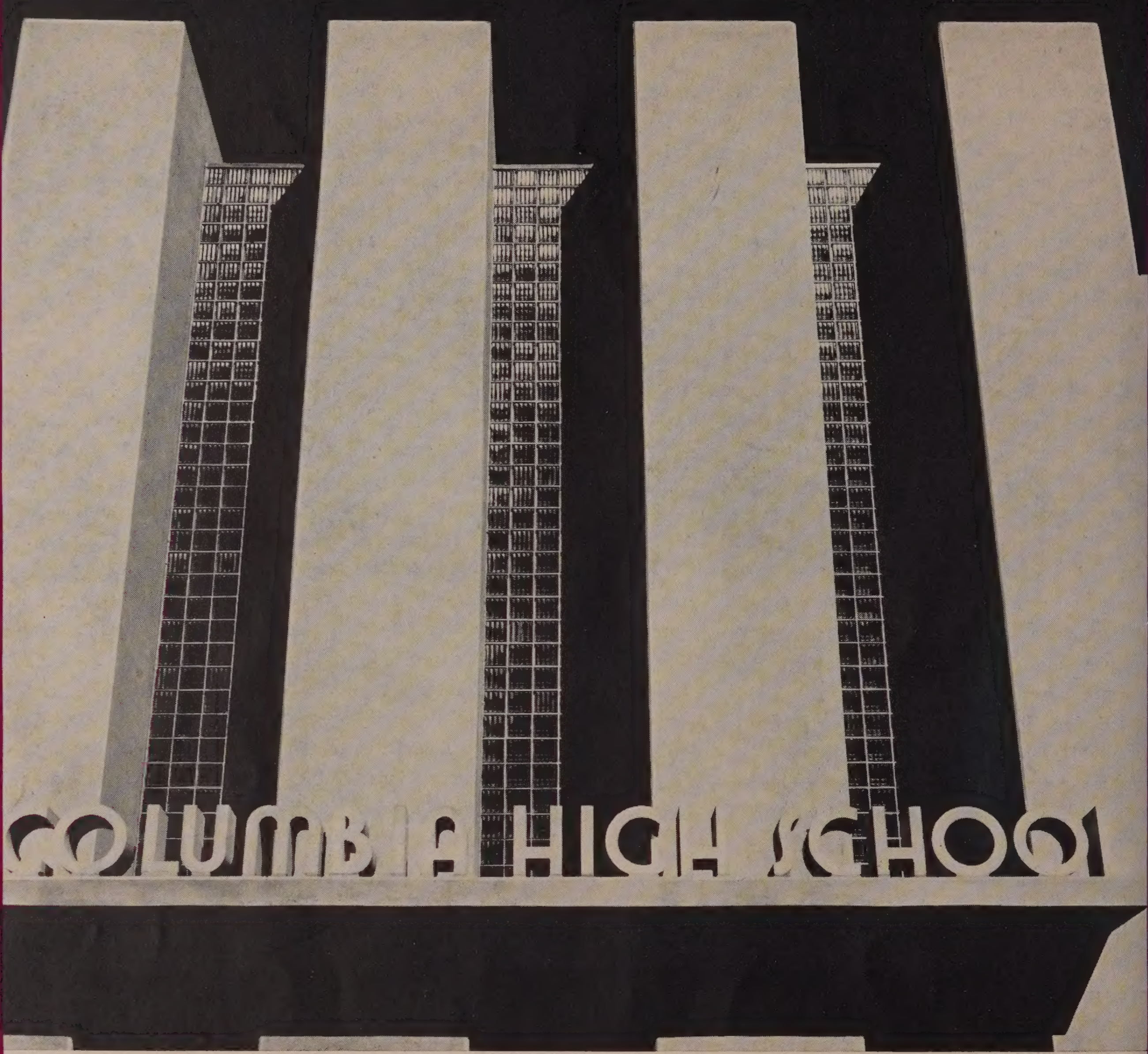
The building was completed in 120 working days at a general contract cost of $120,000. Mechanical trades brought the total cost to $165,000. According to A.I.A. standards the volume of the building is 302,380 cu. ft. including the basement. This space is currently ample for the home office needs of the Schlumberger Corporation, but if the business keeps on expanding as it has in the past five years, the two additional stories can be added quickly.

The decision to use architectural concrete for this building gave us the opportunity to design in this modern material which we had anticipated with much pleasure and the results are highly satisfactory to us and our client.

Designer of the building was The Russell Brown Company, with which the writer is affiliated. Walter P. Moore was consulting engineer and Hubbard Construction Company, general contractor, with F. O. Purcell working as construction superintendent on the project. All concerned with design and construction are from Houston, Texas.

Simply-molded fluting and dentil bands comprise the only ornamental details. The concrete walls are smooth-formed against plywood.





Concrete helps express that "NEW FEELING" in design

A firesafe, stormproof, enduring school at surprisingly low cost.

This striking school was *designed* for Architectural Concrete. As a result, the architects weren't hampered by conventional limitations of design. And costs were kept low, aided by concrete's ability to combine structural with architectural functions.

The *NEW Beauty in Walls of Architectural Concrete*—recently published booklet—shows what others are doing. It contains photographs of splendid buildings, interesting details and characteristic textures. May we send you a copy? Also—*Concrete in Schools—Educational and Architectural Planning*—free booklet treating problems of school design.

[*This association does not furnish plans or designs; that is the function of the architect or engineer, whom we are glad to assist when requested.*]

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue • Chicago, Illinois

The Columbia School at Columbia, Miss. Architects: N. W. Overstreet and A. H. Town, Jackson, Miss. Contractors were M. Dye and J. S. Mullings, Columbia